DCR-HC17E/HC19E/HC21/HC21E/HC22E/ HC32/HC32E/HC33/HC33E

RMT-830/831

SERVICE MANUAL

Ver 1.0 2005.01
Revision History

How to use Acrobat Reader

Photo: DCR-HC32

DCR-HC21/HC32
US Model
Canadian Model
Korea Model

DCR-HC17E/HC19E/HC22E/HC32E
AEP Model
East European Model
North European Model

DCR-HC19E/HC22E/HC32E
UK Model

DCR-HC21/HC21E/HC32/HC32E
E Model

DCR-HC21E/HC32E
Australian Model
Hong Kong Model

DCR-HC21/HC33
Brazilian Model

DCR-HC21E/HC33E
Chinese Model

DCR-HC32/HC32E
Tourist Model

Z MECHANISM (MDX-Z210)

Link

SPECIFICATIONS	BLOCK DIAGRAMS	PRINTED WIRING BOARDS
SERVICE NOTE	FRAME SCHEMATIC DIAGRAMS	REPAIR PARTS LIST
DISASSEMBLY	SCHEMATIC DIAGRAMS	

NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

- For ADJUSTMENTS (SECTION 6), refer to SERVICE MANUAL, ADJ (9-876-782-51).

- For MECHANISM ADJUSTMENTS, refer to the “DV MECHANICAL ADJUSTMENT MANUAL VIII Z (Z200/Z210/Z300/Z310) MECHANISM ” (9-876-724-1□).
- Reference No. search on printed wiring boards is available.
- Table for differences of function of each model.
- TO TAKE OUT A CASSETTE WHEN NOT EJECT (FORCE EJECT)
- HELP: Sheet attachment positions and procedures of processing the flexible boards/harnesses are shown.

On the VC-376/377 boards
This service manual provides the information that is premised the circuit board replacement service and not intended repair inside the VC-376/377 boards.
Therefore, schematic diagrams, printed wiring boards, mounted parts location and electrical parts list of the VC-376/377 boards are not shown.

Mini DV Digital Video Cassette

DIGITAL VIDEO CAMERA RECORDER

SONY®

DCR-HC17E/HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E
9-876-782-31
Sony EMCS Co.
2005A0500-1
© 2005.1
Published by DI Technical Support Section

Self Diagnosis Supported model

HANDYCAM

MEMORY STICK ™

InfoLITHIUM P SERIES

SPECIFICATIONS

System

Video recording system	2 rotary heads, Helical scanning system
DCR-HC32/HC32E/HC33/HC33E:	
Still image recording system	Exif Ver. 2.2*1
Audio recording system	Rotary heads, PCM system Quantization: 12 bits (Fs 32 kHz, stereo 1, stereo 2), 16 bits (Fs 48 kHz, stereo)
Video signal	DCR-HC21/HC32/HC33: NTSC color, EIA standards DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E: PAL color, CCIR standards
Usable cassette	Mini DV cassette with the Mini DV mark printed
Tape speed	SP: Approx. 18.81 mm/s LP: Approx. 12.56 mm/s
Recording/playback time	SP: 60 min LP: 90 min (using a DVM60 cassette)
Fast forward/rewind time	Approx. 2 min 40 s (using a DVM60 cassette)
Viewfinder	Electric viewfinder (black and white)
Image device	3 mm (1/6 type) CCD (Charge Coupled Device) DCR-HC32/HC33: Gross: Approx. 680 000 pixels Effective (still): Approx. 340 000 pixels Effective (movie): Approx. 340 000 pixels DCR-HC21: Gross: Approx. 680 000 pixels Effective (movie): Approx. 340 000 pixels DCR-HC17E/HC19E/HC21E/HC22E: Gross: Approx. 800 000 pixels Effective (movie): Approx. 400 000 pixels DCR-HC32E/HC33E: Gross: Approx. 800 000 pixels Effective (still): Approx. 400 000 pixels Effective (movie): Approx. 400 000 pixels
Lens	Carl Zeiss Vario-Tessar Combined power zoom lens Filter diameter: 25 mm (1 in.) 20 × (Optical), 640 × (Digital, DCR-HC17E), 800 × (Digital, DCR-HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E) F=1.8 - 3.1
Focal length	f=2.3 - 46 mm (3/32 - 1 13/16 in.) When converted to a 35 mm still camera DCR-HC17E/HC19E/HC21/HC21E/HC22E: In CAMERA: 44 - 880 mm (1 3/4 - 34 1/32 in.) DCR-HC32/HC32E/HC33/HC33E: In CAMERA-TAPE: 44 ~ 880 mm (1 3/4 - 34 1/32 in.) In CAMERA-MEMORY: 44 ~ 880 mm (1 3/4 - 34 1/32 in.)
Color temperature	[AUTO], [ONE PUSH], [INDOOR] (3 200 K), [OUTDOOR] (5 800 K)
Minimum illumination	5 lx (lux) (F 1.8) 0 lx (lux) (during NightShot plus function)*2

*1 "Exif" is a file format for still images, established by the JEITA (Japan Electronics and Information Technology Industries Association). Files in this format can have additional information such as your camcorder's setting information at the time of recording.

*2 Objects unable to be seen due to the dark can be shot with infrared lighting.

Input/Output connectors

Audio/Video input/output (DCR-HC32/HC32E/HC33/HC33E)	10-pin connector Input/output auto switch Video signal: 1 Vp-p, 75 Ω (ohms), unbalanced Luminance signal: 1 Vp-p, 75 Ω (ohms), unbalanced Chrominance signal: 0.286 Vp-p, 75 Ω (ohms, DCR-HC32/HC33), 0.3 Vp-p, 75 Ω (ohms, DCR-HC32E/HC33E), unbalanced Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Input impedance more than 47 kΩ (kilohms), Output impedance with less than 2.2 kΩ (kilohms)
Audio/Video output (DCR-HC17E/HC19E/HC21/HC21E/HC22E)	10-pin connector Video signal: 1 Vp-p, 75 Ω (ohms), unbalanced Luminance signal: 1 Vp-p, 75 Ω (ohms), unbalanced Chrominance signal: 0.286 Vp-p, 75 Ω (ohms, DCR-HC21), 0.3 Vp-p, 75 Ω (ohms, DCR-HC17E/HC19E/HC21E/HC22E), unbalanced Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Output impedance with less than 2.2 kΩ (kilohms)
USB jack (DCR-HC17E/HC19E/HC21/HC21E)	mini-B
LANC jack	Stereo mini-minijack (ϕ 2.5 mm)
DV input/output (DCR-HC21/HC21E)	4- pin connector
DV output (DCR-HC17E/HC19E)	4- pin connector

LCD screen

Picture	6.2 cm (2.5 type)
Total dot number	123 200 (560 × 220)

General

Power requirements	DC 7.2 V (battery pack) DC 8.4 V (AC Adaptor)
Average power consumption	DCR-HC32/HC32E/HC33/HC33E: During camera recording using the viewfinder 2.1 W During camera recording using the LCD 2.5 W During camera recording using the viewfinder and the LCD 2.6 W DCR-HC17E/HC19E/HC21/HC21E/HC22E: During camera recording using the viewfinder 1.9 W During camera recording using the LCD 2.4 W
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	-20 °C to + 60 °C (-4 °F to + 140 °F)
Dimensions (approx.)	54.7 × 90 × 111.7 mm (2 1/4 × 3 5/8 × 4 1/2 in.) (w/h/d)
Mass (approx.)	400 g (14 oz) main unit only 460 g (1 lb) including the NP-FP30 rechargeable battery pack and DVM60 cassette.
Supplied accessories	AC Adaptor (1) Power cord (1) Handycam Station (1) (DCR-HC22E/HC32/HC32E/HC33/HC33E) Wireless Remote Commander (1) (DCR-HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E) A/V connecting cable (1) USB cable (1) (DCR-HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E) Shoulder Strap (1) (DCR-HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E) Rechargeable battery pack NP-FP30 (1) CD-ROM "Picture Package Ver. 1.5" (1) Shoe cover (1) Operating Guide (1) 21-pin adaptor (1) (DCR-HC22E/HC32E) Conversion 2P adaptor (1) (DCR-HC21/HC32: E, JE/HC32E: JE) "Memory Stick Duo" 16MB (1) (DCR-HC33/HC33E) Memory Stick Duo adaptor (1) (DCR-HC33/HC33E) See page 5-29

– Continued on next page –

Handycam Station DCRA-C121 (DCR-HC32/HC32E/HC33/HC33E)

Audio/Video input/output	10-pin connector Input/output auto switch Video signal: 1 Vp-p, 75 Ω (ohms), unbalanced Luminance signal: 1 Vp-p, 75 Ω (ohms), unbalanced Chrominance signal: 0.286 Vp-p, 75 Ω (ohms, DCR-HC32/HC33), 0.3 Vp-p, 75 Ω (ohms, DCR-HC32E/HC33E), unbalanced Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Input impedance more than 47 kΩ (kilohms), Output impedance with less than 2.2 kΩ (kilohms)
USB jack	mini-B
DV input/output	4-pin connector

Handycam Station DCRA-C122 (DCR-HC22E)

Audio/Video output	10-pin connector Video signal: 1 Vp-p, 75 Ω (ohms), unbalanced Luminance signal: 1 Vp-p, 75 Ω (ohms), unbalanced Chrominance signal: 0.3 Vp-p, 75 Ω (ohms,), unbalanced Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Otput impedance with less than 2.2 kΩ (kilohms)
USB jack	mini-B
DV input/output	4-pin connector

AC Adaptor AC-L25A/L25B

Power requirements	AC 100 - 240 V, 50/60 Hz
Current consumption	0.35 - 0.18 A
Power consumption	18 W
Output voltage	DC 8.4 V*
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	-20 °C to + 60 °C (-4 °F to + 140 °F)
Dimensions (approx.)	56 × 31 × 100 mm (2 1/4 × 1 1/4 × 4 in.) (w/h/d) excluding the projecting parts
Mass (approx.)	190 g (6.7 oz) excluding the power cord

* See the label on the AC Adaptor for other specifications.

Rechargeable battery pack NP-FP30

Maximum output voltage	DC 8.4 V
Output voltage	DC 7.2 V
Capacity	3.6 wh (500 mAh)
Dimensions (approx.)	31.8 × 18.5 × 40.5 mm (1 5/16 × 3/4 × 1 13/16 in.) (w/h/d)
Mass (approx.)	40 g (1.5 oz)
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Type	Lithium ion

Design and specifications are subject to change without notice.

Table for differences of function

NON MS model

Model	DCR-HC17E	DCR-HC19E	DCR-HC21	DCR-HC21E	DCR-HC22E
Destination	AEP, NE, EE	AEP, UK, NE, EE	US, CND, E, KR, BR	E, HK, AUS, CH	AEP, UK, NE, EE
Color system	PAL	PAL	NTSC	PAL	PAL
Memory Stick Duo	×	×	×	×	×
A/V jack	OUT	OUT	OUT	OUT	OUT
DV Interface	OUT	OUT	IN/OUT	IN/OUT	IN/OUT (Note)
Remote commander	×	○ (RMT-830)	○ (RMT-830)	○ (RMT-830)	○ (RMT-830)
Cradle (Handycam Station)	×	×	×	×	○
CR board	×	×	×	×	CR-050
VC board	VC-376	VC-376	VC-376	VC-376	VC-376

MS model

Model	DCR-HC32	DCR-HC32E	DCR-HC33	DCR-HC33E
Destination	US, CND, E, KR, JE	AEP, UK, NE, EE, E, HK, AUS, JE	BR	CH
Color system	NTSC	PAL	NTSC	PAL
Memory Stick Duo	○	○	○	○
A/V jack	IN/OUT	IN/OUT	IN/OUT	IN/OUT
DV Interface	IN/OUT (Note)	IN/OUT (Note)	IN/OUT (Note)	IN/OUT (Note)
Remote commander	○ (RMT-831)	○ (RMT-831)	○ (RMT-831)	○ (RMT-831)
Cradle (Handycam Station)	○	○	○	○
CR board	CR-050	CR-050	CR-050	CR-050
VC board	VC-377	VC-377	VC-377	VC-377

Note: DV Interface on the Cradle (Handycam Station)

- Abbreviation
  AUS : Australian model
  BR : Brazilian model
  CH : Chinese model
  CND : Canadian model
  EE : East European model
  HK : Hong Kong model
  JE : Tourist model
  KR : Korean model
  NE : North European model

CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. FLEXIBLE Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270°C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

Unleaded solder

Boards requiring use of unleaded solder are printed with the lead-free mark (LF) indicating the solder contains no lead.
(Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

Unleaded solder has the following characteristics.

- Unleaded solder melts at a temperature about 40°C higher than ordinary solder.
  Ordinary soldering irons can be used but the iron tip has to be applied to the solder joint for a slightly longer time.
  Soldering irons using a temperature regulator should be set to about 350°C.
  Caution: The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful!
- Strong viscosity
  Unleaded solder is more viscous (sticky, less prone to flow) than ordinary solder so use caution not to let solder bridges occur such as on IC pins, etc.
- Usable with ordinary solder
  It is best to use only unleaded solder but unleaded solder may also be added to ordinary solder.

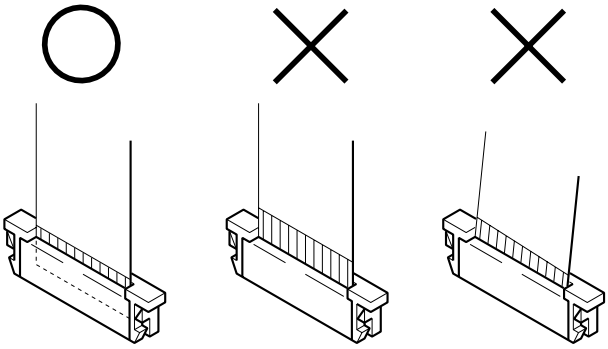
TABLE OF CONTENTS

Section	Title	Page
1.	**SERVICE NOTE**	
1-1.	Note for Repair	1-1
1-2.	Power Supply During Repairs	1-1
1-3.	To Take Out a Cassette when not Eject (Force Eject)	1-2
1-4.	Self-diagnosis Function	1-2
1-4-1.	Self-diagnosis Function	1-2
1-4-2.	Self-diagnosis Display	1-2
1-4-3.	Self-diagnosis Code Table	1-3
2.	**DISASSEMBLY**	
2-1.	Disassembly	2-1
2-2.	Mechanism Deck Service Position	2-5
2-3.	LCD Service Position	2-7
2-4.	The Method of Attachment of FP-185 Flexible Board	2-8
2-5.	Circuit Boards Location	2-9
2-6.	Flexible Boards Location	2-10
3.	**BLOCK DIAGRAMS**	
3-1.	Block Diagrams (Non MS model)	3-1
3-1-1.	Overall Block Diagram (1/5) (Non MS model)	3-1
3-1-2.	Overall Block Diagram (2/5) (Non MS model)	3-3
3-1-3.	Overall Block Diagram (3/5) (Non MS model)	3-5
3-1-4.	Overall Block Diagram (4/5) (Non MS model)	3-7
3-1-5.	Overall Block Diagram (5/5) (Non MS model)	3-9
3-1-6.	Power Block Diagram (1/3) (Non MS model)	3-11
3-1-7.	Power Block Diagram (2/3) (Non MS model)	3-13
3-1-8.	Power Block Diagram (3/3) (Non MS model)	3-15
3-2.	Block Diagrams (MS model)	3-17
3-2-1.	Overall Block Diagram (1/6) (MS model)	3-17
3-2-2.	Overall Block Diagram (2/6) (MS model)	3-19
3-2-3.	Overall Block Diagram (3/6) (MS model)	3-21
3-2-4.	Overall Block Diagram (4/6) (MS model)	3-23
3-2-5.	Overall Block Diagram (5/6) (MS model)	3-25
3-2-6.	Overall Block Diagram (6/6) (MS model)	3-27
3-2-7.	Power Block Diagram (1/3) (MS model)	3-29
3-2-8.	Power Block Diagram (2/3) (MS model)	3-31
3-2-9.	Power Block Diagram (3/3) (MS model)	3-33
4.	**PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS**	
4-1.	Frame Schematic Diagrams	4-1
4-2.	Schematic Diagrams	4-5
	CD-533 (CCD IMAGER)	4-7
	PD-237 (LCD DRIVE, BACKLIGHT DRIVE)	4-65
	CR-050 (CRADLE TERMINAL)	4-67
	SI-042 (REMOTE COMMANDER RECEIVER, PITCH/YAW SENSOR)	4-69
	FP-182 FLEXIBLE	4-71
	JK-278 (JACK)	4-71
	MS-249 (MS CONNECTOR)	4-71
	LB-109 (EVF, EVF BACKLIGHT)	4-73
	FP-186 FLEXIBLE (PANEL REVERSE DETECT)	4-73
	FP-180 FLEXIBLE (DC IN)	4-74
	FP-187 FLEXIBLE (CONTROL SWITCH)	4-74
	FP-826, FP-467, FP-228 FLEXIBLE	4-75
	CONTROL KEY BLOCK (SS10300)	4-77
	CONTROL KEY BLOCK (SB9000)	4-78
4-3.	Printed Wiring Boards	4-79
	CD-533	4-81
	PD-237	4-91
	CR-050	4-93
	SI-042	4-94
	LB-109	4-94
	JK-278	4-95
	MS-249	4-96
	FP-180, FP-186, FP-187 FLEXIBLE	4-97
	FP-826, FP-467, FP-228 FLEXIBLE	4-99
4-4.	Waveforms	4-101
4-5.	Mounted Parts Location	4-117
5.	**REPAIR PARTS LIST**	
	Exploded Views	5-2
5-1-1.	Overall Assembly	5-2
5-1-2.	F Panel Block	5-3
5-1-3.	Lens Block	5-4
5-1-4.	Cabinet (R) Block	5-5
5-1-5.	CS Block	5-6
5-1-6.	Bat EVF Block	5-7
5-1-7.	Mechanism Deck	5-8
5-1-8.	LS Chassis Block Assembly	5-9
5-1-9.	Mechanism Chassis Block Assembly	5-10
5-2.	Electrical Parts List	5-11

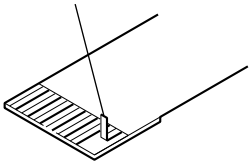
1. SERVICE NOTE

1-1. NOTE FOR REPAIR

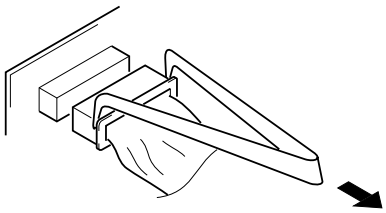
Make sure that the flat cable and flexible board are not cracked of bent at the terminal.
Do not insert the cable insufficiently nor crookedly.



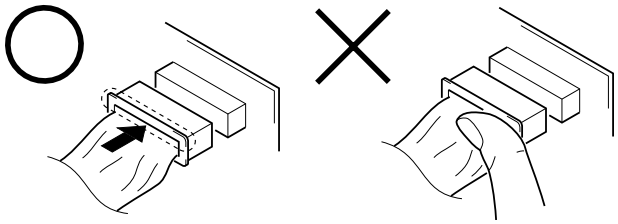
Cut and remove the part of gilt which comes off at the point. (Be careful or some pieces of gilt may be left inside)



When remove a connector, don't pull at wire of connector.
It is possible that a wire is snapped.



When installing a connector, don't press down at wire of connector.
It is possible that a wire is snapped.



1-2. POWER SUPPLY DURING REPAIRS

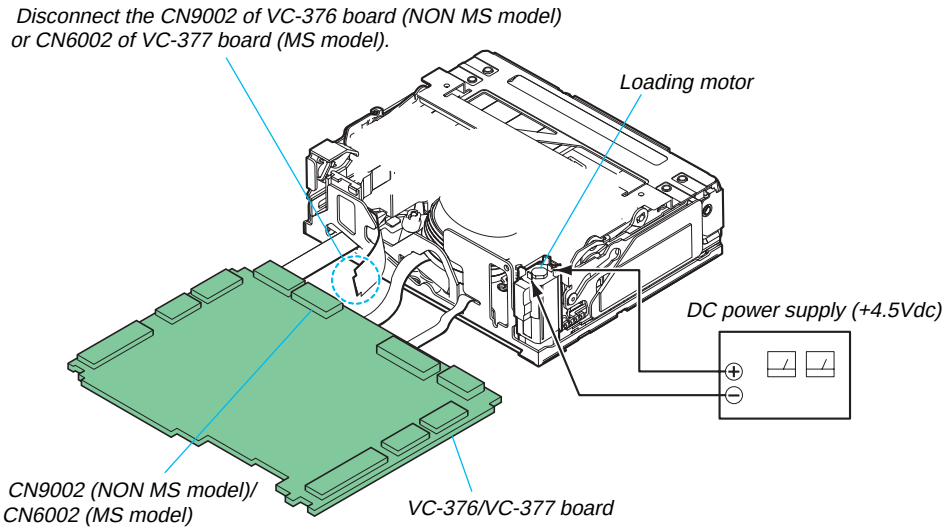
In this unit, about 10 seconds after power is supplied to the battery terminal using the regulated power supply (8.4V), the power is shut off so that the unit cannot operate.
These following method is available to prevent this.

Method:
Use the AC power adaptor (AC-L25A/L25B).

1-3. TO TAKE OUT A CASSETTE WHEN NOT EJECT (FORCE EJECT)

① Refer to “2. DISASSEMBLY” to remove the mechanism deck block.
② Disconnect the CN9002 of VC-376 board (NON MS model) or CN6002 of VC-377 board (MS model).
③ Supply +4.5V from the DC power supply to the loading motor and unload with a pressing the cassette compartment.

NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E


Disconnect the CN9002 of VC-376 board (NON MS model)
or CN6002 of VC-377 board (MS model).
Loading motor
DC power supply (+4.5Vdc)
CN9002 (NON MS model)/
CN6002 (MS model)
VC-376/VC-377 board

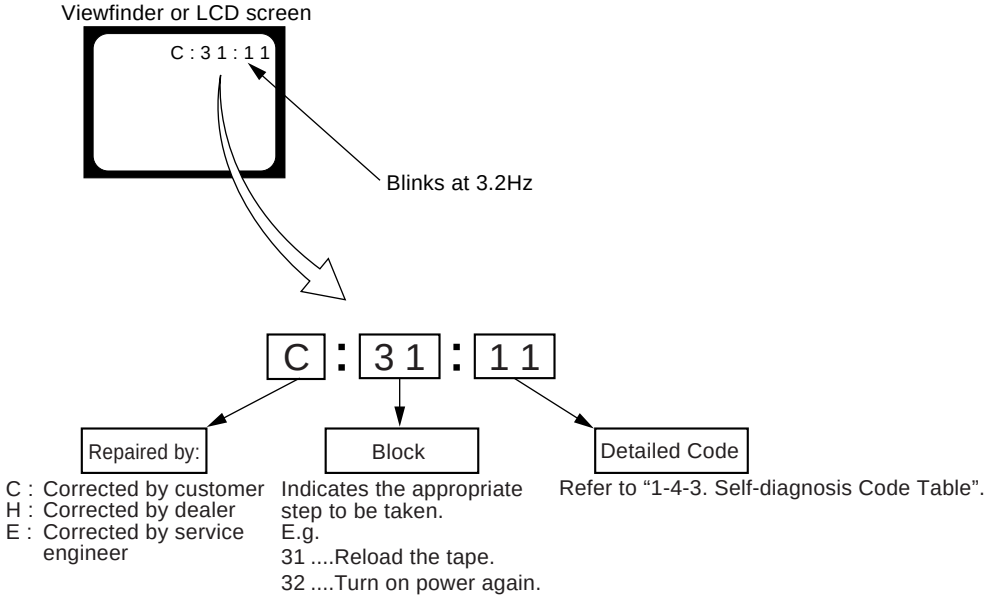
1-4. SELF-DIAGNOSIS FUNCTION

1-4-1. Self-diagnosis Function

When problems occur while the unit is operating, the self-diagnosis function starts working, and displays on the viewfinder or LCD screen what to do. This function consists of two display; self-diagnosis display and service mode display.
Details of the self-diagnosis functions are provided in the Instruction manual.

1-4-2. Self-diagnosis Display

When problems occur while the unit is operating, the counter of the viewfinder or LCD screen shows a 4-digit display consisting of an alphabet and numbers, which blinks at 3.2 Hz. This 5-character display indicates the “repaired by:”, “block” in which the problem occurred, and “detailed code” of the problem.


Viewfinder or LCD screen
C : 3 1 : 1 1
Blinks at 3.2Hz
C : 31 : 11
Repaired by:
Block
Detailed Code
C : Corrected by customer
H : Corrected by dealer
E : Corrected by service engineer
Indicates the appropriate step to be taken.
E.g.
31 ....Reload the tape.
32 ....Turn on power again.
Refer to “1-4-3. Self-diagnosis Code Table”.

1-4-3. Self-diagnosis Code Table

Self-diagnosis Code					Symptom/State	Correction
Repaired by:	Block Function		Detailed Code			
C	0	4	0	0	Non-standard battery is used.	Use the InfoLITHIUM battery.
C	2	1	0	0	Condensation.	Remove the cassette, and insert it again after one hour.
C	2	2	0	0	Video head is dirty.	Clean with the optional cleaning cassette.
C	3	1	1	0	LOAD direction. Loading does not complete within specified time	Load the tape again, and perform operations from the beginning.
C	3	1	1	1	UNLOAD direction. Loading does not complete within specified time	Load the tape again, and perform operations from the beginning.
C	3	1	2	0	T reel side tape slacking when unloading.	Load the tape again, and perform operations from the beginning.
C	3	1	2	1	S reel side tape slacking when unloading.	Load the tape again, and perform operations from the beginning.
C	3	1	2	2	T reel fault.	Load the tape again, and perform operations from the beginning.
C	3	1	2	3	S reel fault.	Load the tape again, and perform operations from the beginning.
C	3	1	3	0	FG fault when starting capstan.	Load the tape again, and perform operations from the beginning.
C	3	1	3	1	FG fault during normal capstan operations.	Load the tape again, and perform operations from the beginning.
C	3	1	4	0	FG fault when starting drum.	Load the tape again, and perform operations from the beginning.
C	3	1	4	1	PG fault when starting drum.	Load the tape again, and perform operations from the beginning.
C	3	1	4	2	FG fault during normal drum operations.	Load the tape again, and perform operations from the beginning.
C	3	1	4	3	PG fault during normal drum operations.	Load the tape again, and perform operations from the beginning.
C	3	1	4	4	Phase fault during normal drum operations.	Load the tape again, and perform operations from the beginning.
C	3	2	1	0	LOAD direction loading motor time-out.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	1	1	UNLOAD direction loading motor time-out.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	2	0	T reel side tape slacking when unloading.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	2	1	S reel side tape slacking when unloading.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	2	2	T reel fault.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	2	3	S reel fault.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	3	0	FG fault when starting capstan.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	3	1	FG fault during normal capstan operations.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	4	0	FG fault when starting drum.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	4	1	PG fault when starting drum.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	4	2	FG fault during normal drum operations.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	4	3	PG fault during normal drum operations.	Remove the battery or power cable, connect, and perform operations from the beginning.
C	3	2	4	4	Phase fault during normal drum operations.	Remove the battery or power cable, connect, and perform operations from the beginning.

Self-diagnosis Code			Symptom/State	Correction
Repaired by:	Block Function	Detailed Code		
E	6 1	0 0	Difficult to adjust focus (Cannot initialize focus.)	Inspect the lens block focus reset sensor (Note) when focusing is performed when the touch panel is operated in the focus manual mode and the focus motor drive circuit (Note) when the focusing is not performed.
E	6 1	1 0	Zoom operations fault (Cannot initialize zoom lens.)	Inspect the lens block zoom reset sensor (Note) when zooming is performed when the zoom switch is operated and the zoom motor drive circuit (Note) when zooming is not performed.
E	6 1	1 1	Focus lens intializing failure and zoom lens initializing failure occur simultaneously.	Inspect the flexible board for breakage or loose connection. If not faulty, inspect the focus and zoom motor drive circuit (Note).
E	6 2	0 0	Steadyshot function does not work well. (With pitch angular velocity sensor output stopped.)	Inspect pitch angular velocity sensor (SE601 of SI-042 board) peripheral circuits.
E	6 2	0 1	Steadyshot function does not work well. (With yaw angular velocity sensor output stopped.)	Inspect yaw angular velocity sensor (SE602 of SI-042 board) peripheral circuits.

Note:

Focus reset sensor	Pin ㉑ of CN3101 on VC-376 board (NON MS model)
	Pin ㉑ of CN3701 on VC-377 board (MS model)
Focus motor drive circuit	IC3101 of VC-376 board (NON MS model)
	IC3707 of VC-377 board (MS model)
Zoom reset sensor	Pin ⑯ of CN3101 on VC-376 board (NON MS model)
	Pin ⑯ of CN3701 on VC-377 board (MS model)
Zoom motor drive circuit	IC3101 of VC-376 board (NON MS model)
	IC3707 of VC-377 board (MS model)

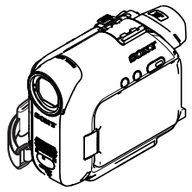
NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

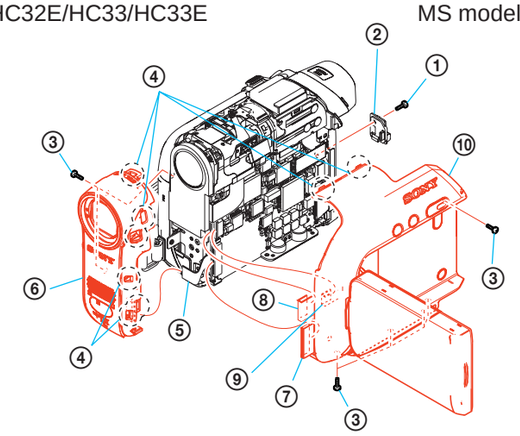
2. DISASSEMBLY

The following flow chart shows the disassembly procedure.

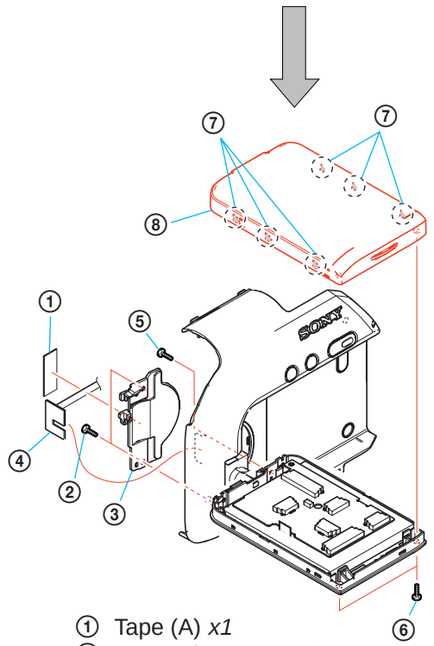
2-1. DISASSEMBLY

Non Cradle model: DCR-HC17E/HC19E/HC21/HC21E
Cradle model: DCR-HC22E/HC32E/HC33/HC33E



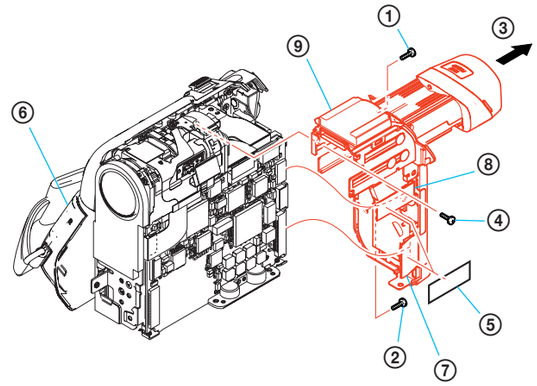


① P2 lock ace screw (M1.7) *x1*
② Cpc lid
③ Screw (M1.7) *x7*
④ Claw *x8*
⑤ Flexible flat cable (FFC-038): CN603
⑥ F panel block
⑦ FP-190 flexible board: CN1003 (cradle model)
⑧ FP-185 flexible board: CN1006
⑨ FP-187 flexible board: CN1002
⑩ Cabinet (R) block

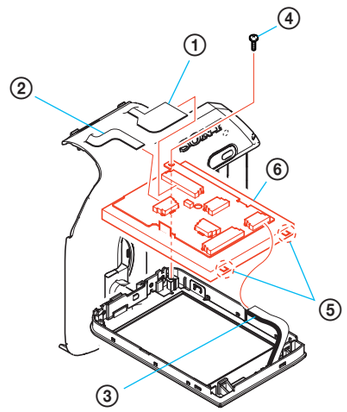


① Tape (A) *x1*
② P2 tapping screw *x2*
③ Hinge blind
④ FP-187 flexible board
⑤ Tapping screw *x1*
⑥ P2 tapping screw *x2*
⑦ Claw *x6*
⑧ P cabinet (C) 103

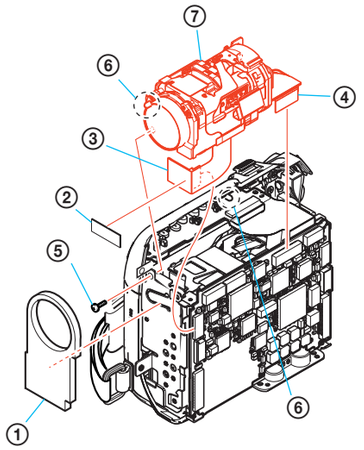
Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E



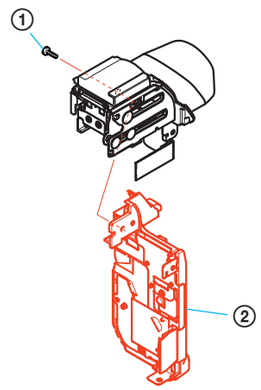
① P2 lock ace screw (M1.7) *x1*
② P2 lock ace screw (M1.7) *x1*
③ Slide the EVF block.
④ P2 tappping screw *x1*
⑤ Tape (A) *x2* HELP
⑥ Open the cabinet (G) block.
⑦ FP-180 flexible board: CN2001
⑧ FP-181 flexible board: CN7001 (MS model)/ CN9301 (non MS model)
⑨ BAT EVF block



① FP-185 flexible board: CN601
② FP-186 flexible board: CN609
③ Control key block (SB9000): CN602
④ P2 tapping screw *x1*
⑤ Claw *x2*
⑥ PD-237 board, D901, LCD901



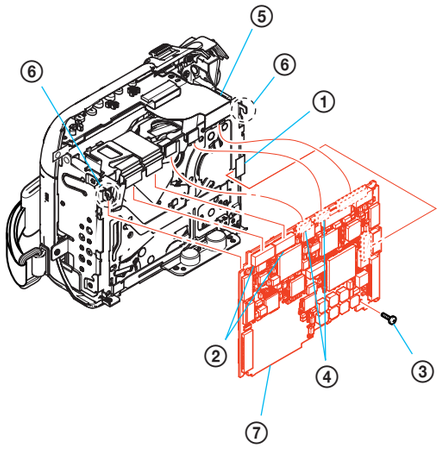
① Cushion (F2)
② Tape (W) *x1*
③ Flexible board: CN 3101 (VC-376 board)/ CN3701 (VC-377 board)
④ FP-178 flexible board: CN3002 (VC-376 board)/ CN3101 (VC-377 board)
⑤ P2 lock ace screw (M1.7) *x1*
⑥ Boss *x2*
⑦ Lens block



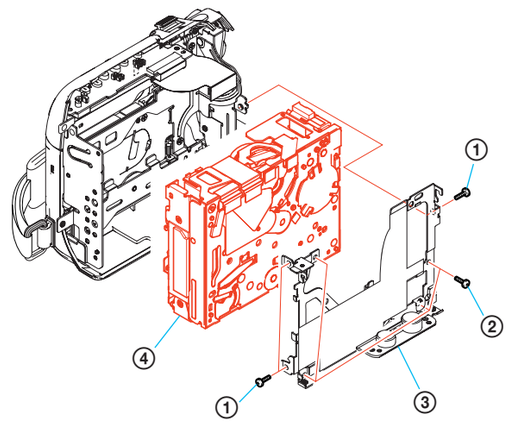
① Ccrew (M1.7) *x1*
② BT panel block

to Page 2-3

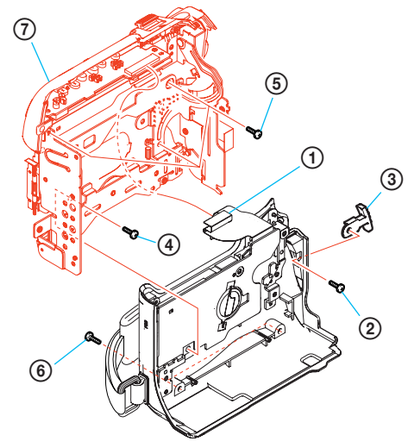
from Page 2-2



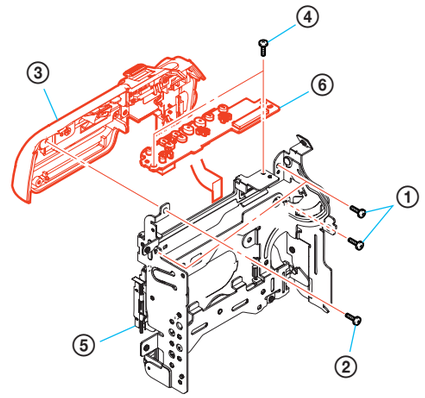
① Flexible board: CN1001
② Connector *x2*: CN9002, 9003 (VC-376 board)/ CN6002, 6003 (VC-377 board)
③ P2 lock ace screw (M1.7) *x1*
④ Connector *x2*: CN6501, 9001 (VC-376 board)/ CN4301, 6001 (VC-377 board)
⑤ FP-182 flexible board: CN1008
⑥ Hook *x2*
⑦ VC-376 board/VC-377 board



① P2 lock ace screw (M1.7) *x3*
② Screw (M1.4x1.5) *x4*
③ MD frame block
④ Mechanism deck

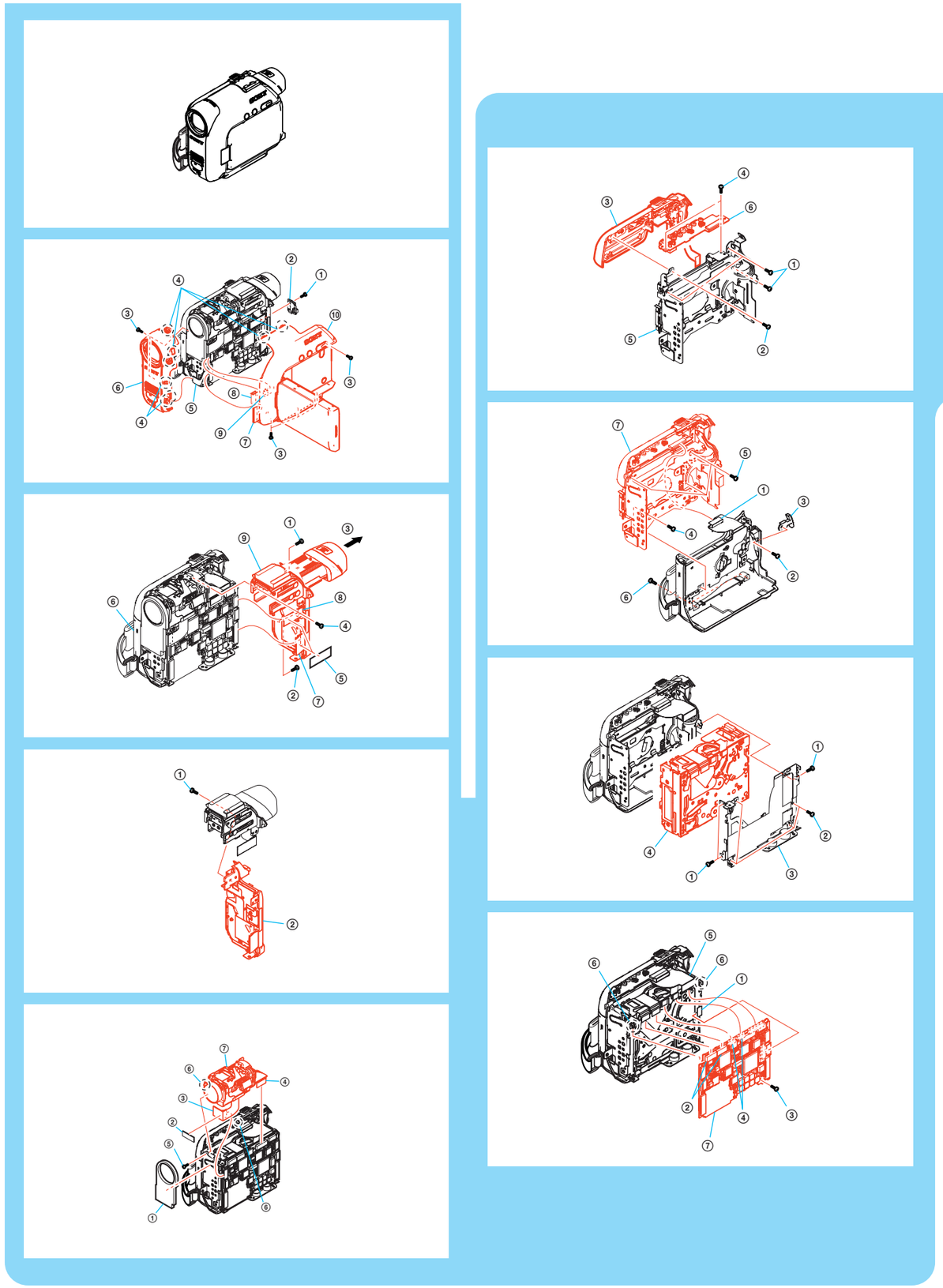


① Flexible board: CN704
② P2 lock ace screw (M1.7) *x1*
③ Eject knob
④ P2 lock ace screw (M1.7) *x1*
⑤ Tapping screw *x3*
⑥ P2 lock ace screw (M1.7) *x2*
⑦ CS block



① P2 tapping screw (M1.7) *x3*
② P2 lock ace screw (M1.7) *x1*
③ Control key block (SS10300)
④ P2 lock ace screw (M1.7) *x2*
⑤ CS frame block
⑥ JK-278 board

2-2. MECHANISM DECK SERVICE POSITION



Connection to Check the Mechanism deck

To check the mechanism deck, set the Camera or VTR to the "Forced power ON" mode.
(Or, connect the control key block (SS10300) to the CN1001 of VC-376/VC-377 board and set the power switch to the "CAMERA" or "PLAY/EDIT" position.)
Operate the VTR function using the adjustment remote commander
(with the HOLD switch set in the OFF position).

Setting the "Forced Camera Power ON" mode

1) Select page: 0, address: 01, and set data: 01.
2) Select page: A (MS model)/ D (Non MS model), address: 10, set data: 01 and press the PAUSE button of the adjustment remote commander.

Setting the "Forced VTR Power ON" mode

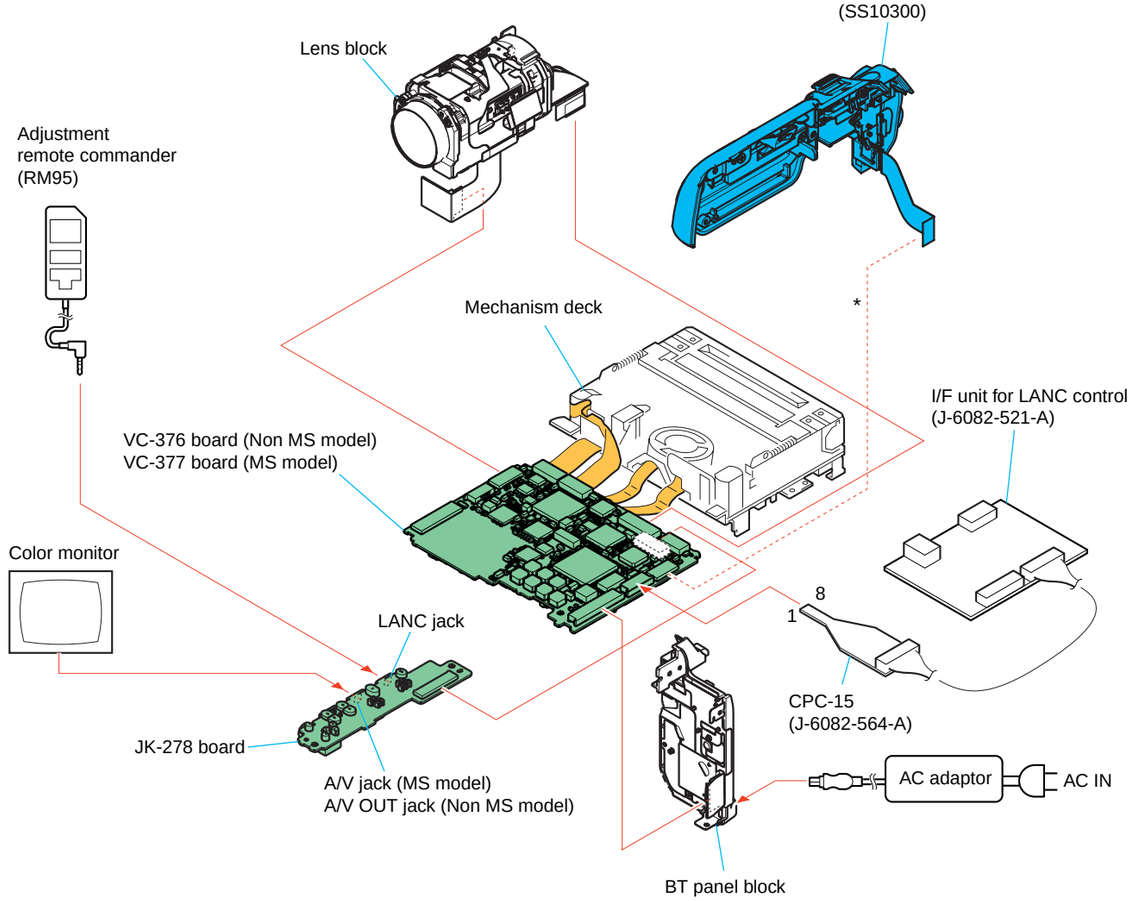
1) Select page: 0, address: 01, and set data: 01.
2) Select page: A (MS model)/ D (Non MS model), address: 10, set data: 02 and press the PAUSE button of the adjustment remote commander.

Exiting the "Forced Power ON" mode

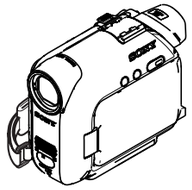
1) Select page: 0, address: 01, and set data: 01.
2) Select page: A (MS model)/ D (Non MS model), address: 10, data: 00, and press the PAUSE button of the adjustment remote commander.
3) Select page: 0, address: 01, and set data: 00.

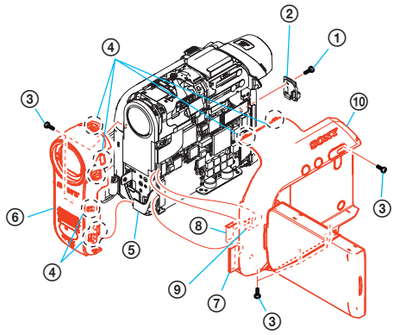
Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

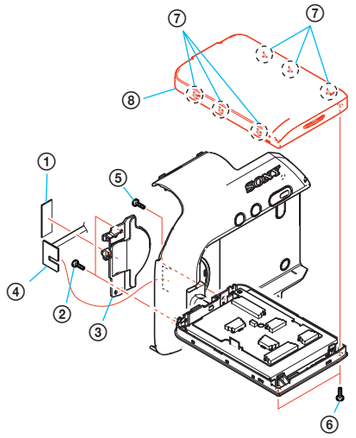
*: To eject a cassette, connect the cabinet (L) block assembly.

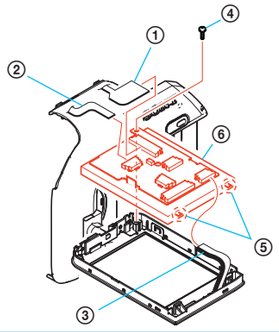


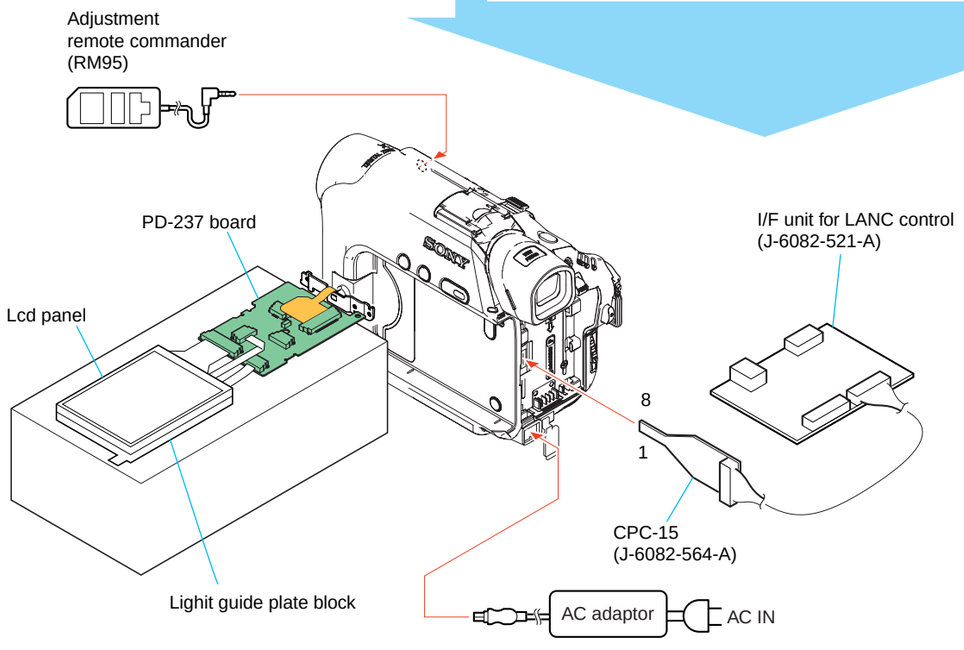
2-3. LCD SERVICE POSITION



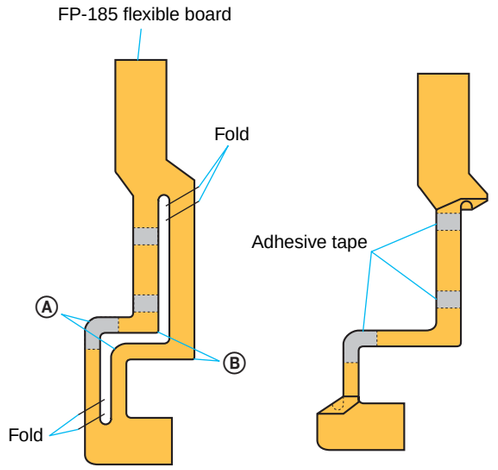




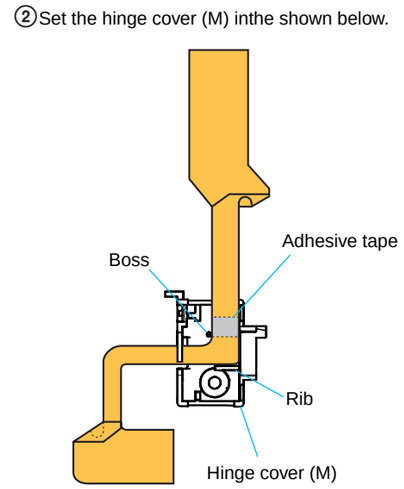




2-4. THE METHOD OF ATTACHMENT OF FP-185 FLEXIBLE BOARD

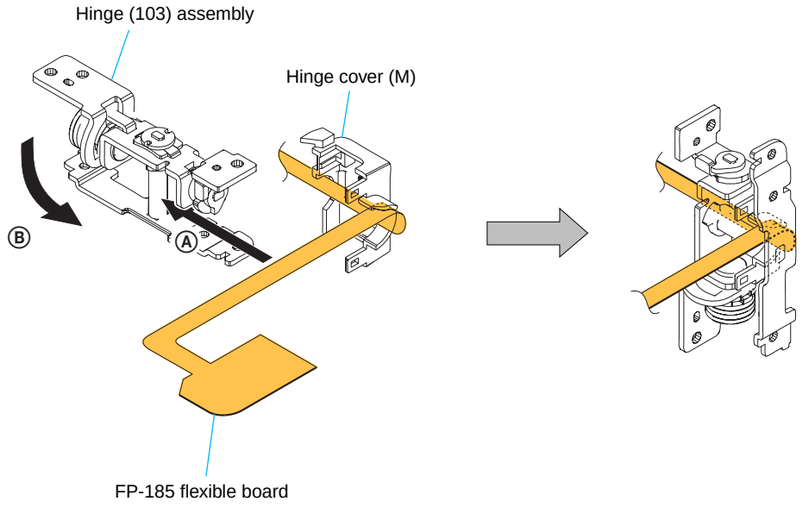


① The Ⓐ and Ⓐ, Ⓑ and Ⓑ section are united and an angle is folded.



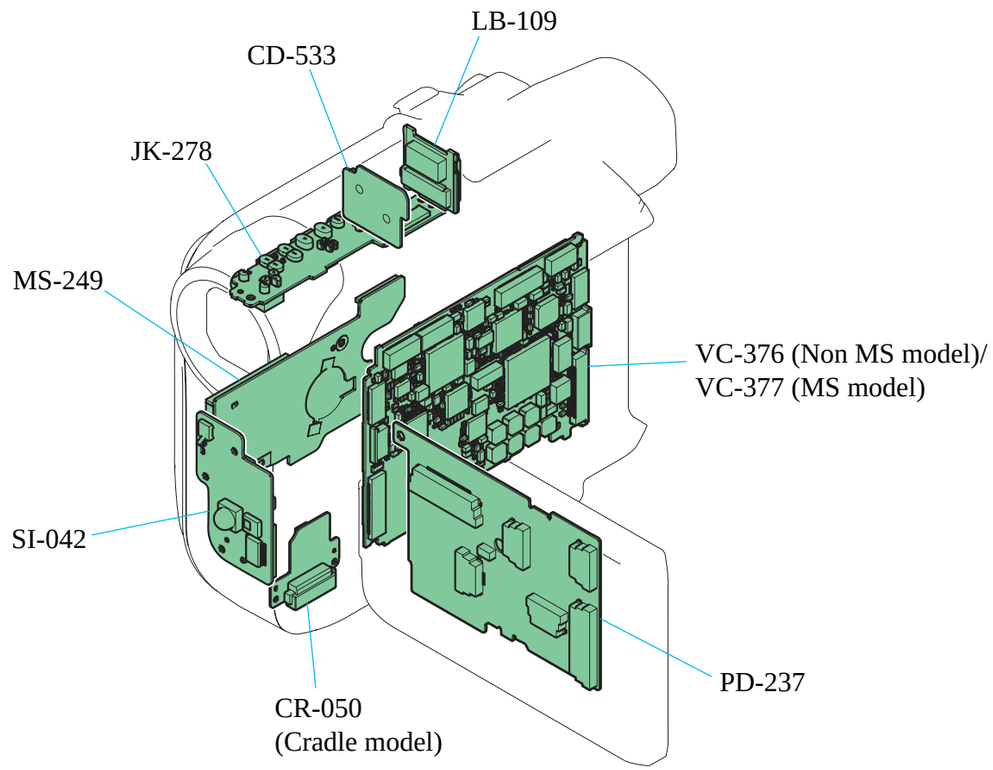
② Set the hinge cover (M) inthe shown below.

③ Set the FP-185 flexible board in the direction of arrow Ⓐ, and then turn the hinge (103) assembly in the direction of arrow Ⓑ.



2-5. CIRCUIT BOARDS LOCATION

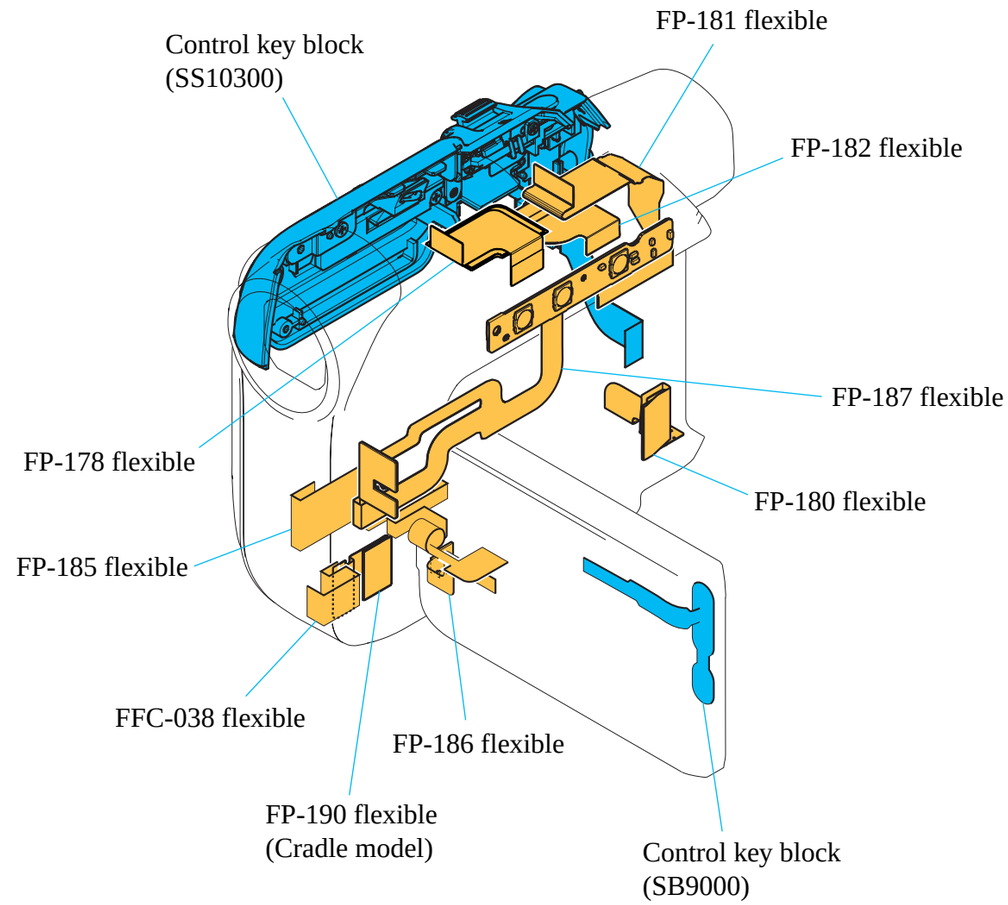
Non Cradle model: DCR-HC17E/HC19E/HC21/HC21E
Cradle model: DCR-HC22E/HC32/HC32E/HC33/HC33E
Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E



Board Name	Function
CD-533	CCD IMAGER
CR-050	CRADLE TERMINAL
JK-278	JACK
LB-109	EVF, EVF BACKLIGHT
MS-249	MS CONNECTOR
PD-237	LCD DRIVE, BACKLIGHT DRIVE
SI-042	REMOTE COMMANDER RECEIVER, PITCH/YAW SENSOR
VC-376	A/D CONVERTER, TIMING GENERATOR, LENS DRIVE, EVR, DV SIGNAL PROCESS, DV INTERFACE, REC/PB AMP, VIDEO OUT, AUDIO I/O EVF DRIVE, CAMERA/MECHA CONTROL, SERVO, HI CONTROL, DC IN, DC/DC CONVERTER, CONNECTOR
VC-377	A/D CONVERTER, TIMING GENERATOR, LENS DRIVE, VIDEO/AUDIO DSP, DS/HI CONTROL, FLASH, SDRAM, DV SIGNAL PROCESS, DV INTERFACE, REC/PB AMP, VIDEO, AUDIO I/O, EVF DRIVE, CAMERA/MECHA CONTROL, SERVO, HI CONTROL, DC IN, DC/DC CONVERTER, CONNECTOR

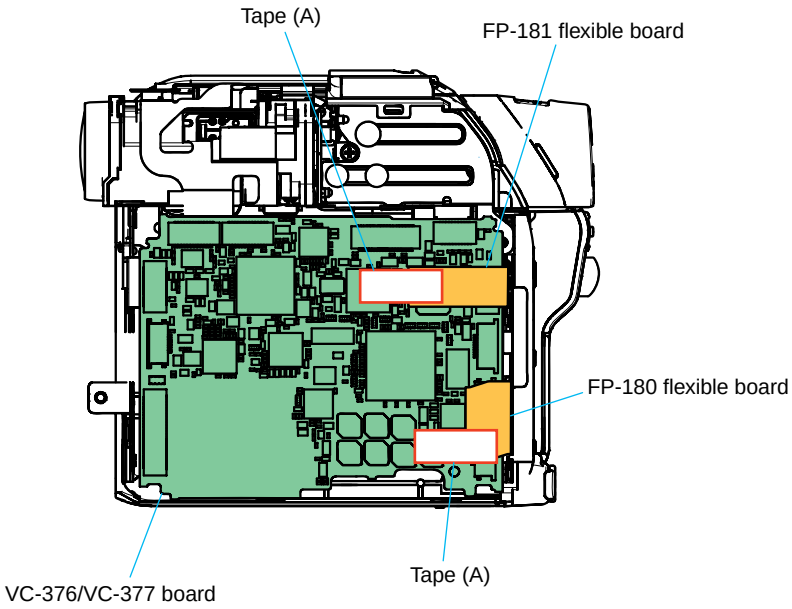
2-6. FLEXIBLE BOARDS LOCATION

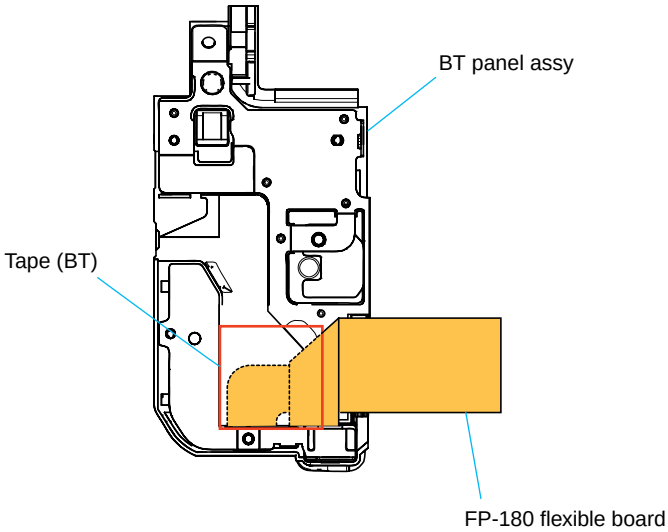
Non Cradle model: DCR-HC17E/HC19E/HC21/HC21E
Cradle model: DCR-HC22E/HC32/HC32E/HC33/HC33E



HELP

Sheet attachment positions and procedures of processing the flexible boards/harnesses are shown.





3. BLOCK DIAGRAMS

NON MS model

Link

OVERALL BLOCK DIAGRAM (1/5)	OVERALL BLOCK DIAGRAM (5/5)
OVERALL BLOCK DIAGRAM (2/5)	POWER BLOCK DIAGRAM (1/3)
OVERALL BLOCK DIAGRAM (3/5)	POWER BLOCK DIAGRAM (2/3)
OVERALL BLOCK DIAGRAM (4/5)	POWER BLOCK DIAGRAM (3/3)

MS model

Link

OVERALL BLOCK DIAGRAM (1/6)	OVERALL BLOCK DIAGRAM (6/6)
OVERALL BLOCK DIAGRAM (2/6)	POWER BLOCK DIAGRAM (1/3)
OVERALL BLOCK DIAGRAM (3/6)	POWER BLOCK DIAGRAM (2/3)
OVERALL BLOCK DIAGRAM (4/6)	POWER BLOCK DIAGRAM (3/3)
OVERALL BLOCK DIAGRAM (5/6)	

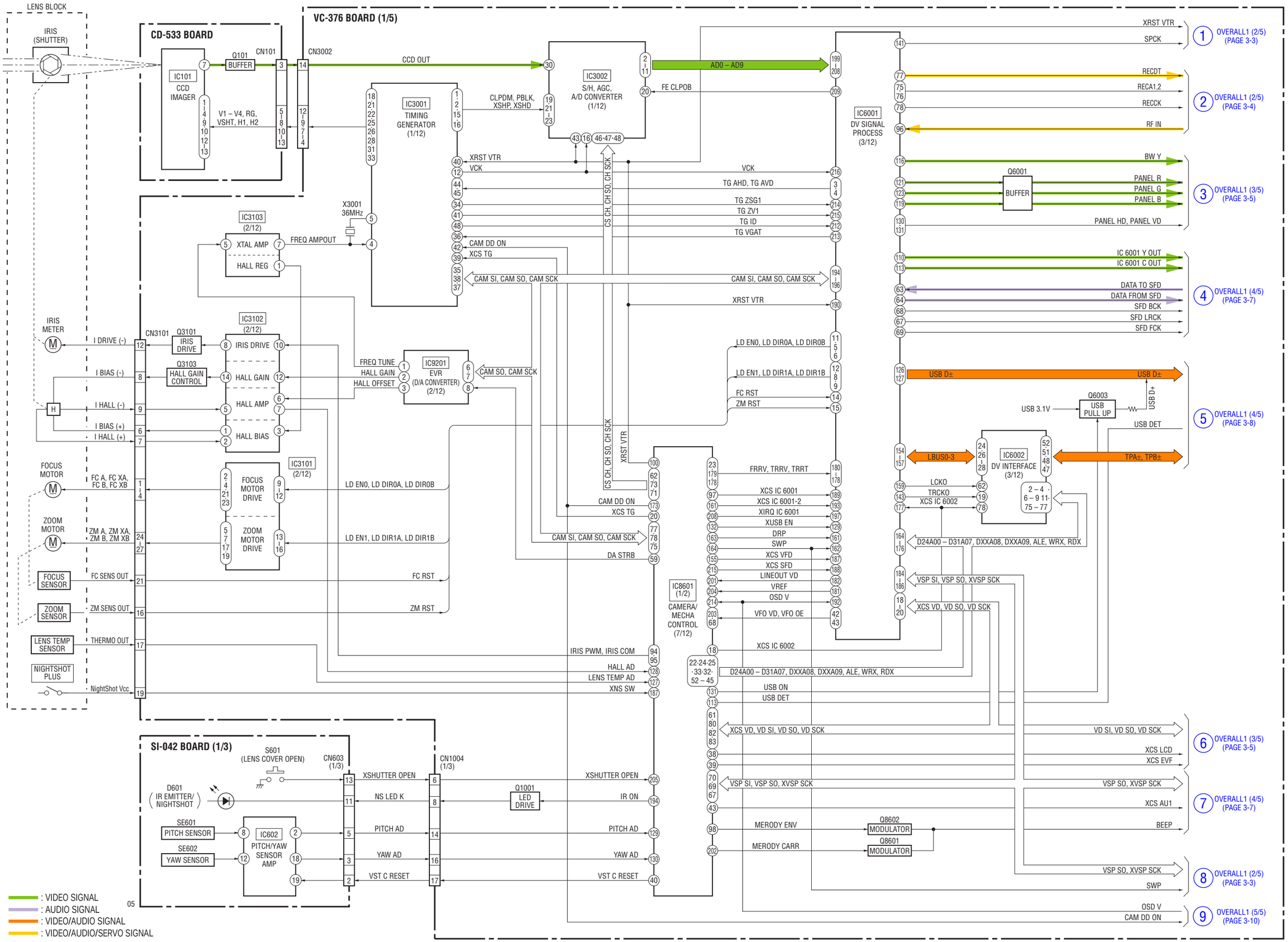
NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

3. BLOCK DIAGRAMS

3-1. BLOCK DIAGRAMS (NON MS model)

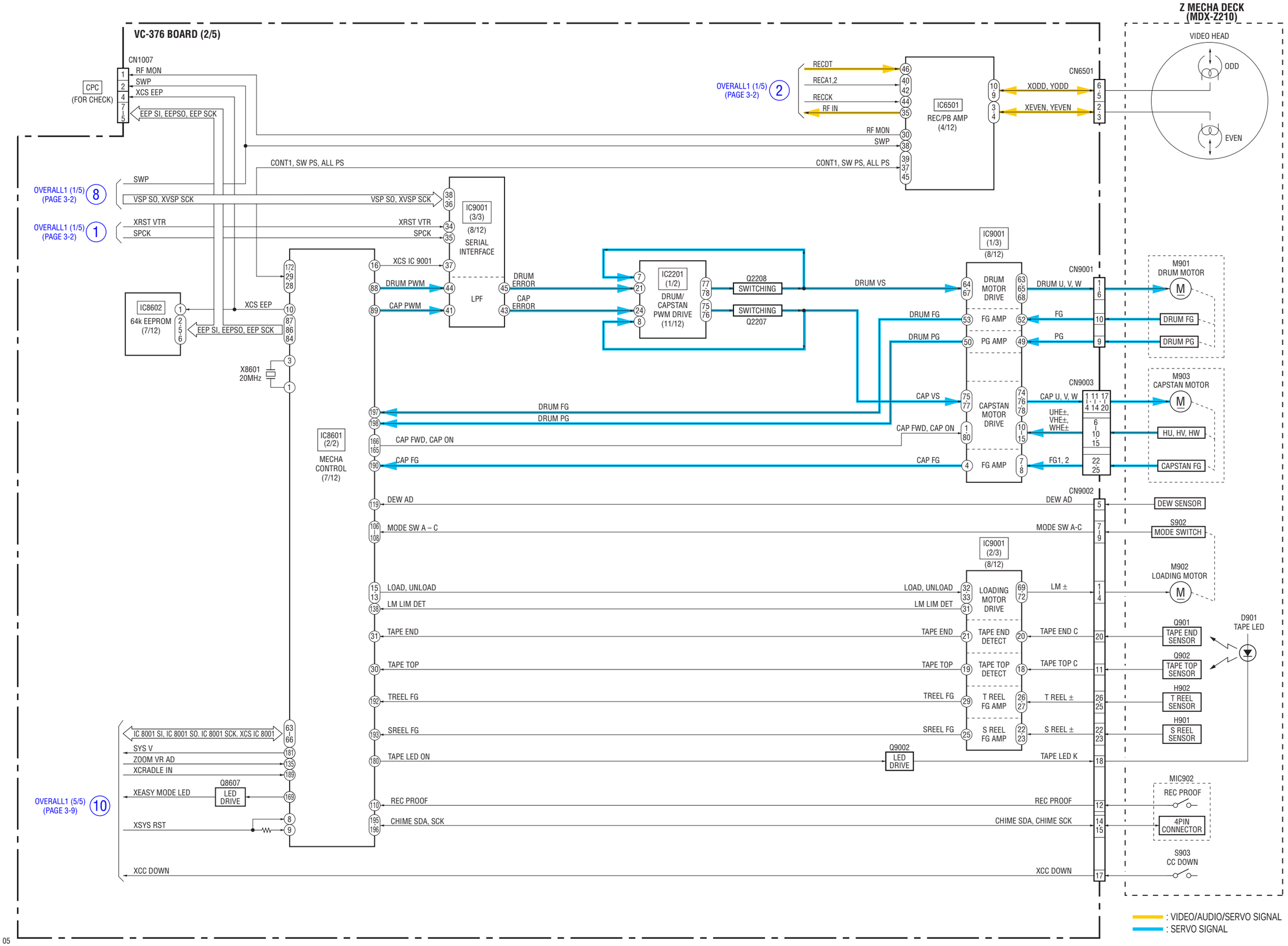
3-1-1. OVERALL BLOCK DIAGRAM (1/5) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



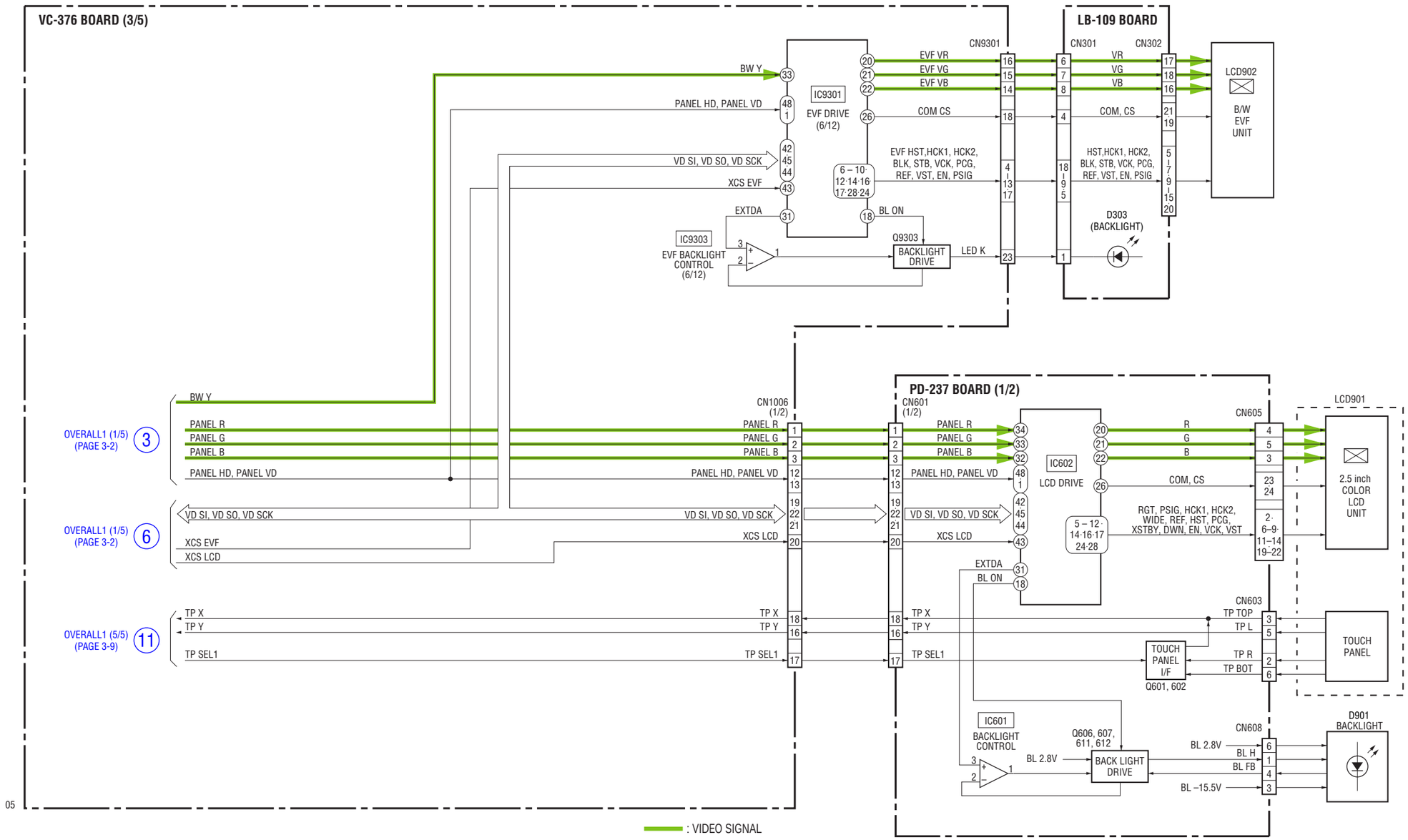
3-1-2. OVERALL BLOCK DIAGRAM (2/5) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



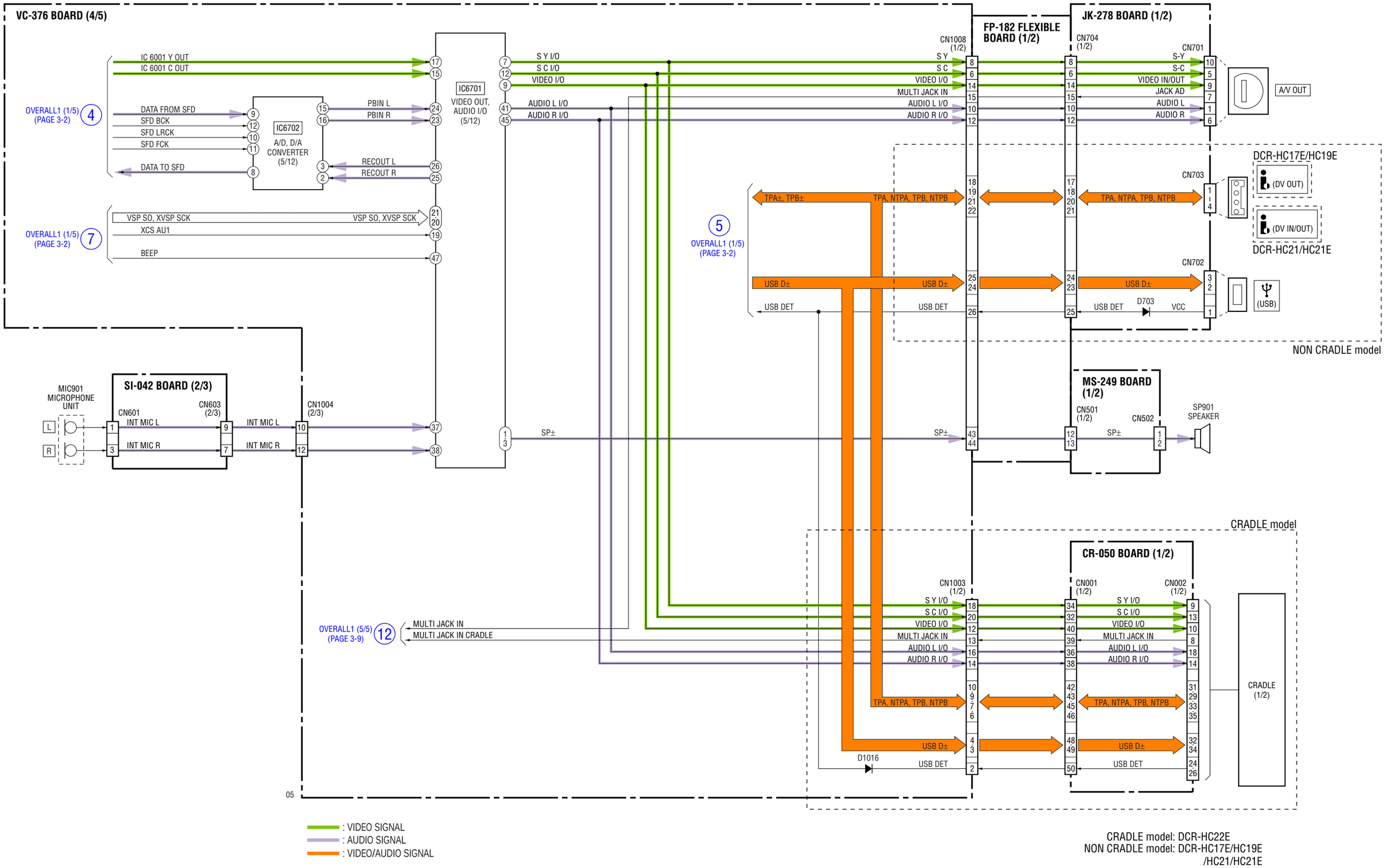
3-1-3. OVERALL BLOCK DIAGRAM (3/5) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3-1-4. OVERALL BLOCK DIAGRAM (4/5) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.

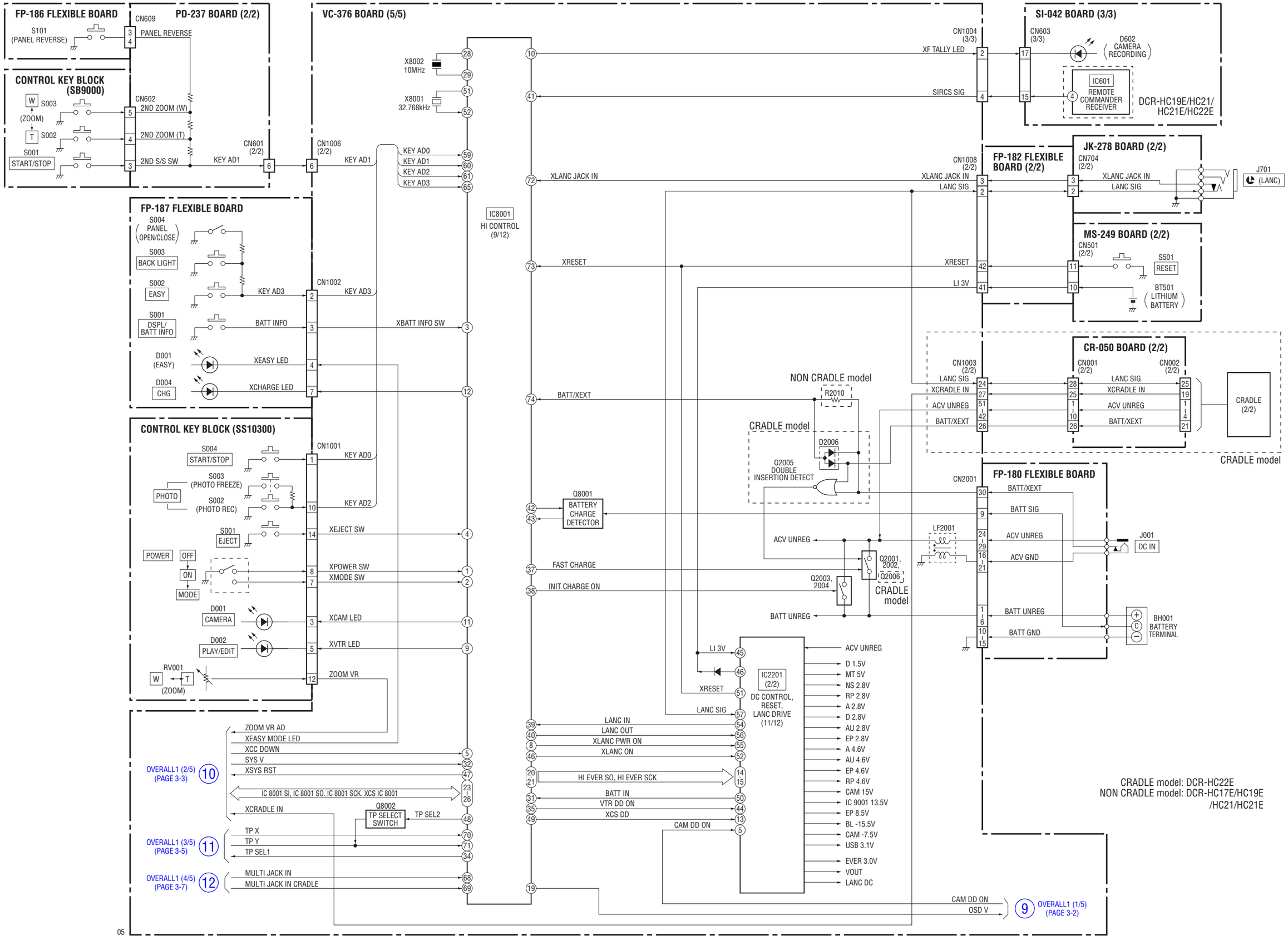


: VIDEO SIGNAL
: AUDIO SIGNAL
: VIDEO/AUDIO SIGNAL

CRADLE model: DCR-HC22E
NON CRADLE model: DCR-HC17E/HC19E /HC21/HC21E

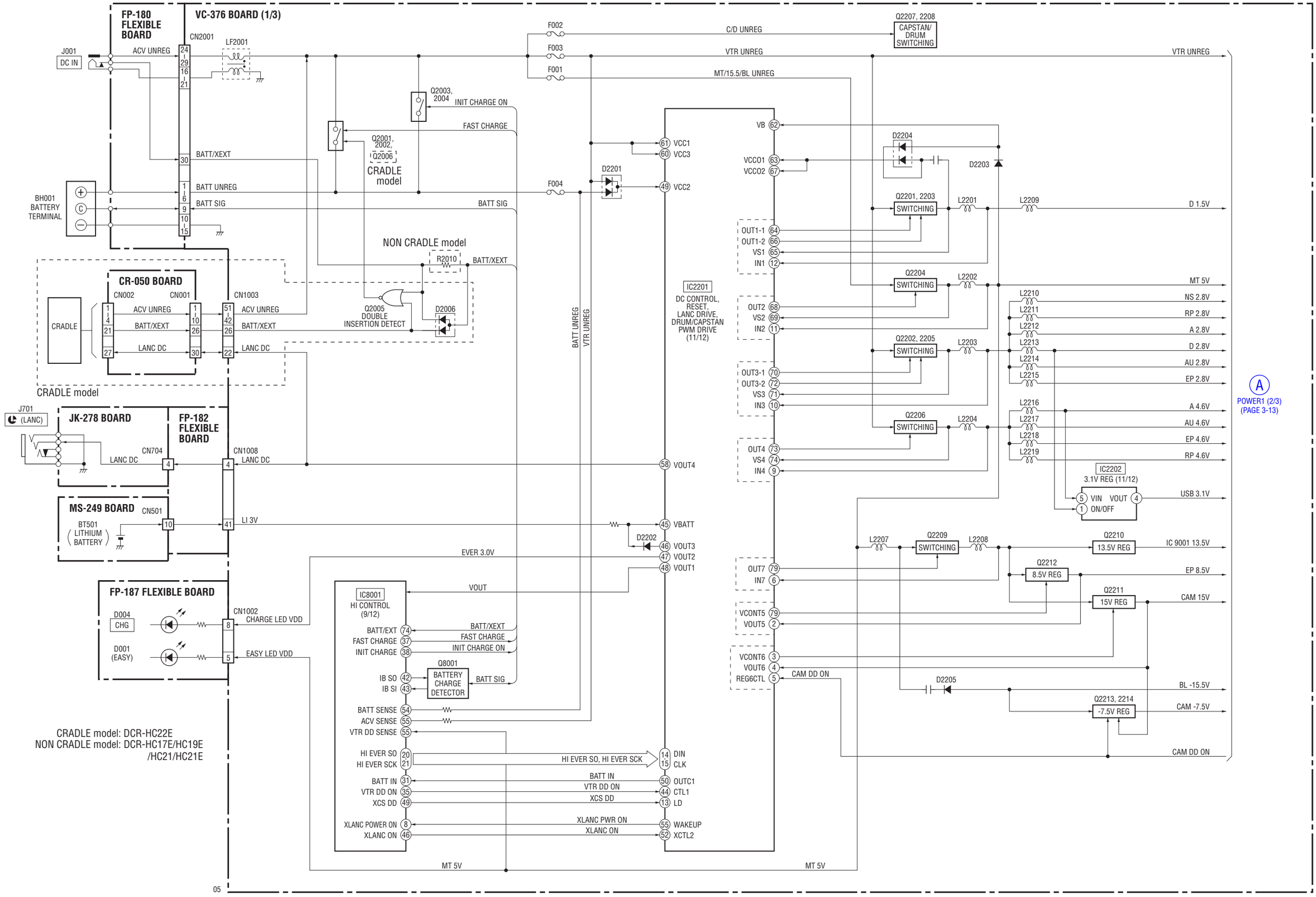
3-1-5. OVERALL BLOCK DIAGRAM (5/5) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



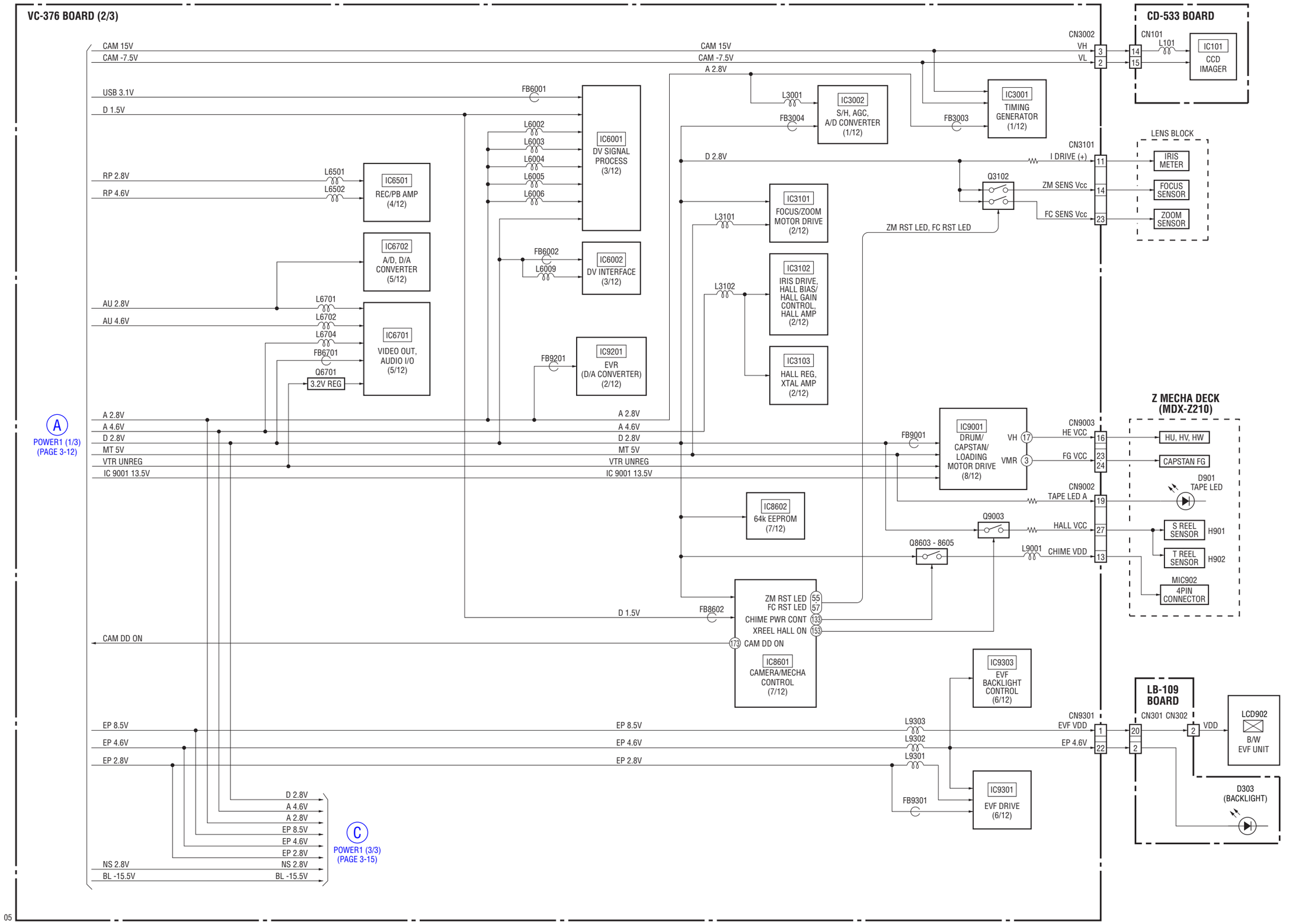
3-1-6. POWER BLOCK DIAGRAM (1/3) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



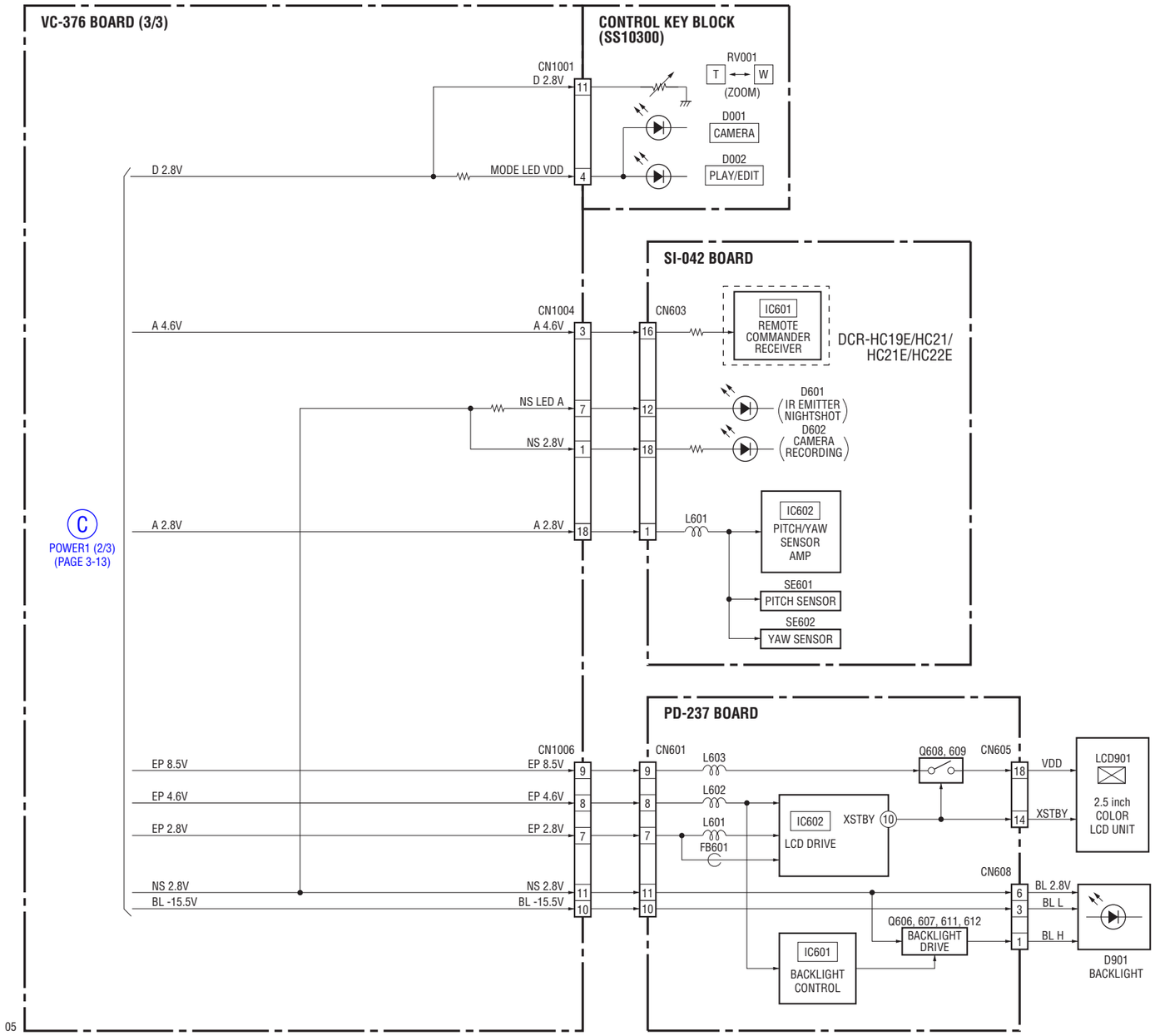
3-1-7. POWER BLOCK DIAGRAM (2/3) (NON MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3-1-8. POWER BLOCK DIAGRAM (3/3) (NON MS model)

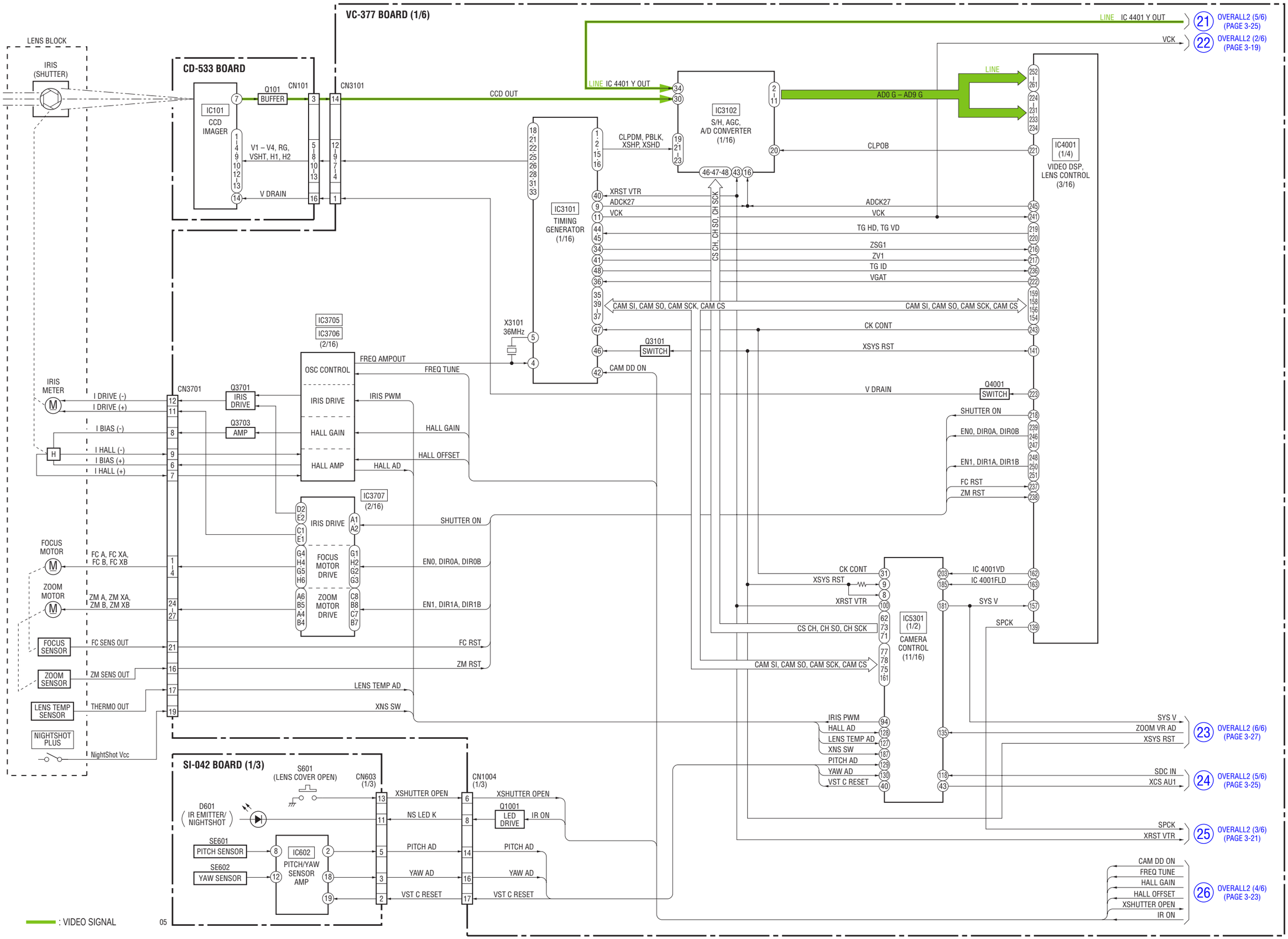
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3-2. BLOCK DIAGRAMS (MS model)

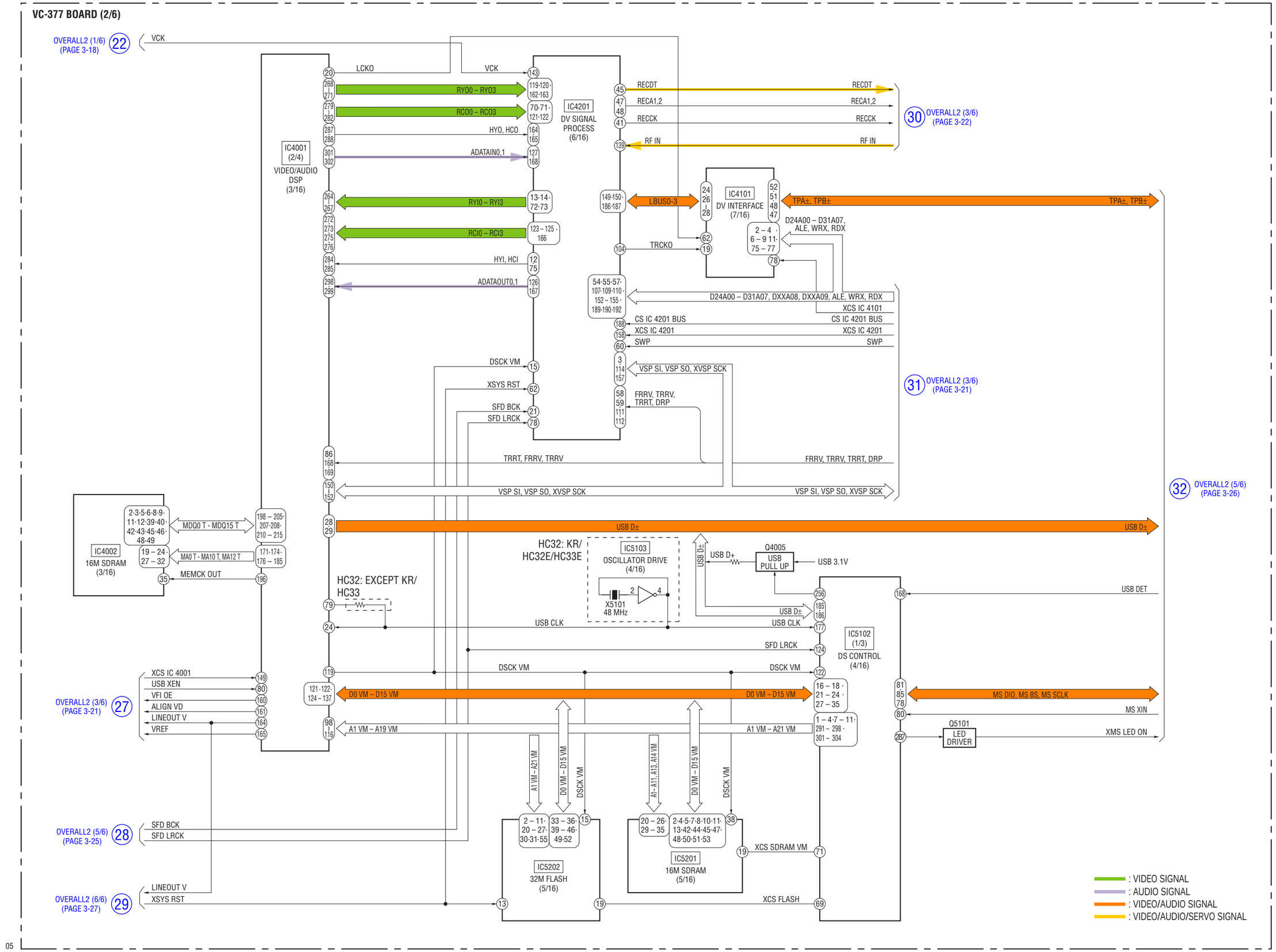
3-2-1. OVERALL BLOCK DIAGRAM (1/6) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3-2-2. OVERALL BLOCK DIAGRAM (2/6) (MS model)

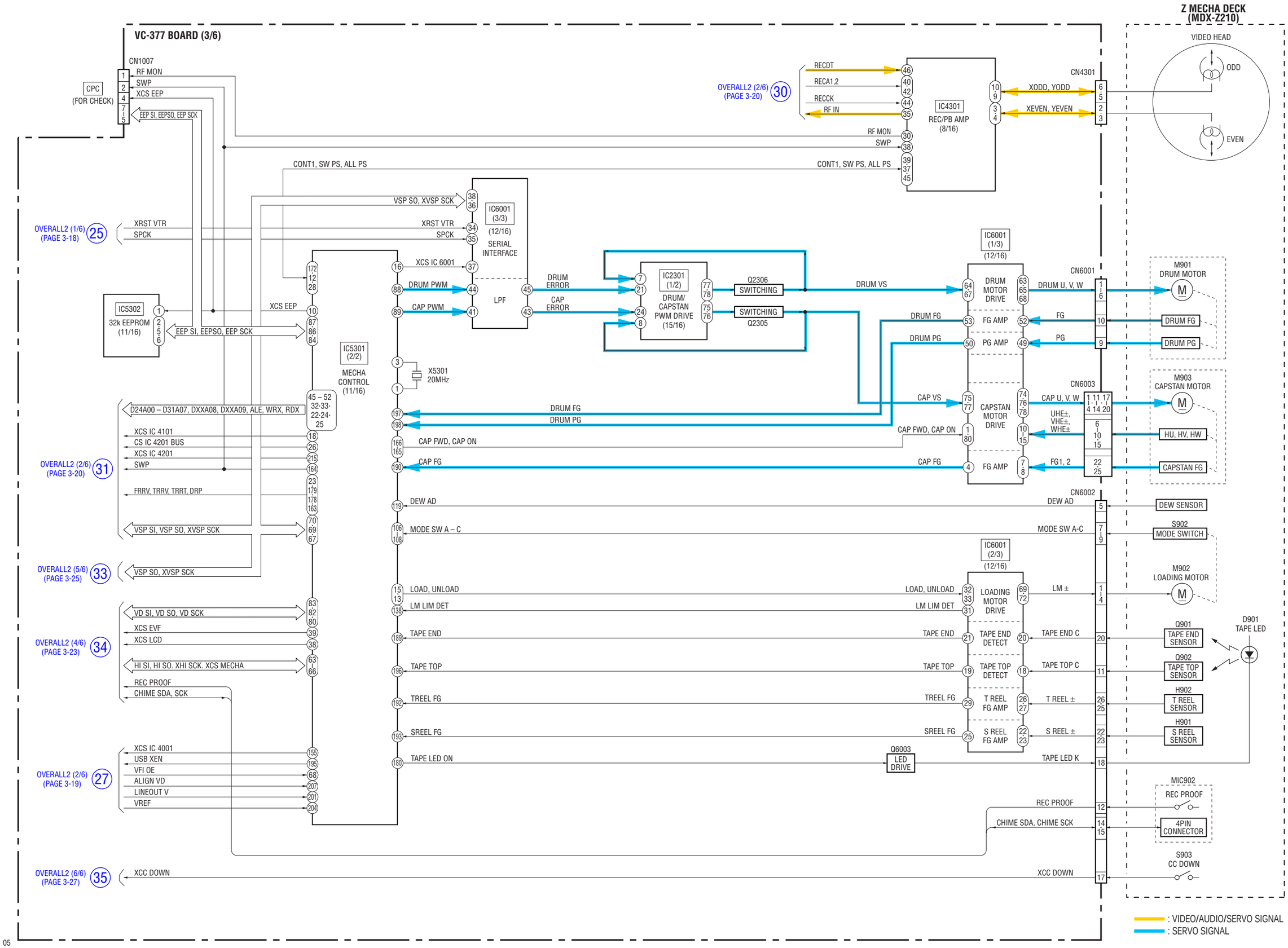
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



05

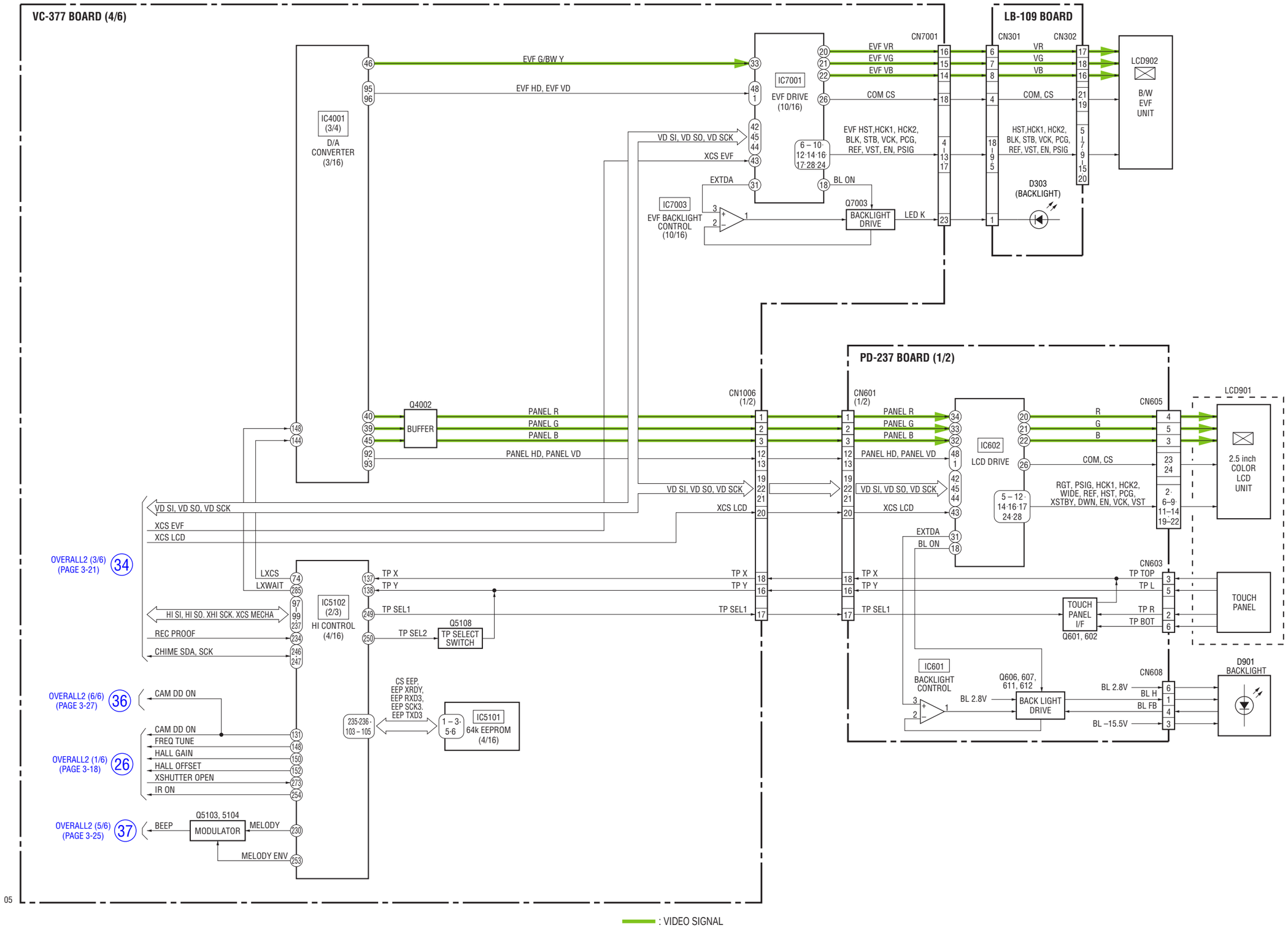
3-2-3. OVERALL BLOCK DIAGRAM (3/6) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



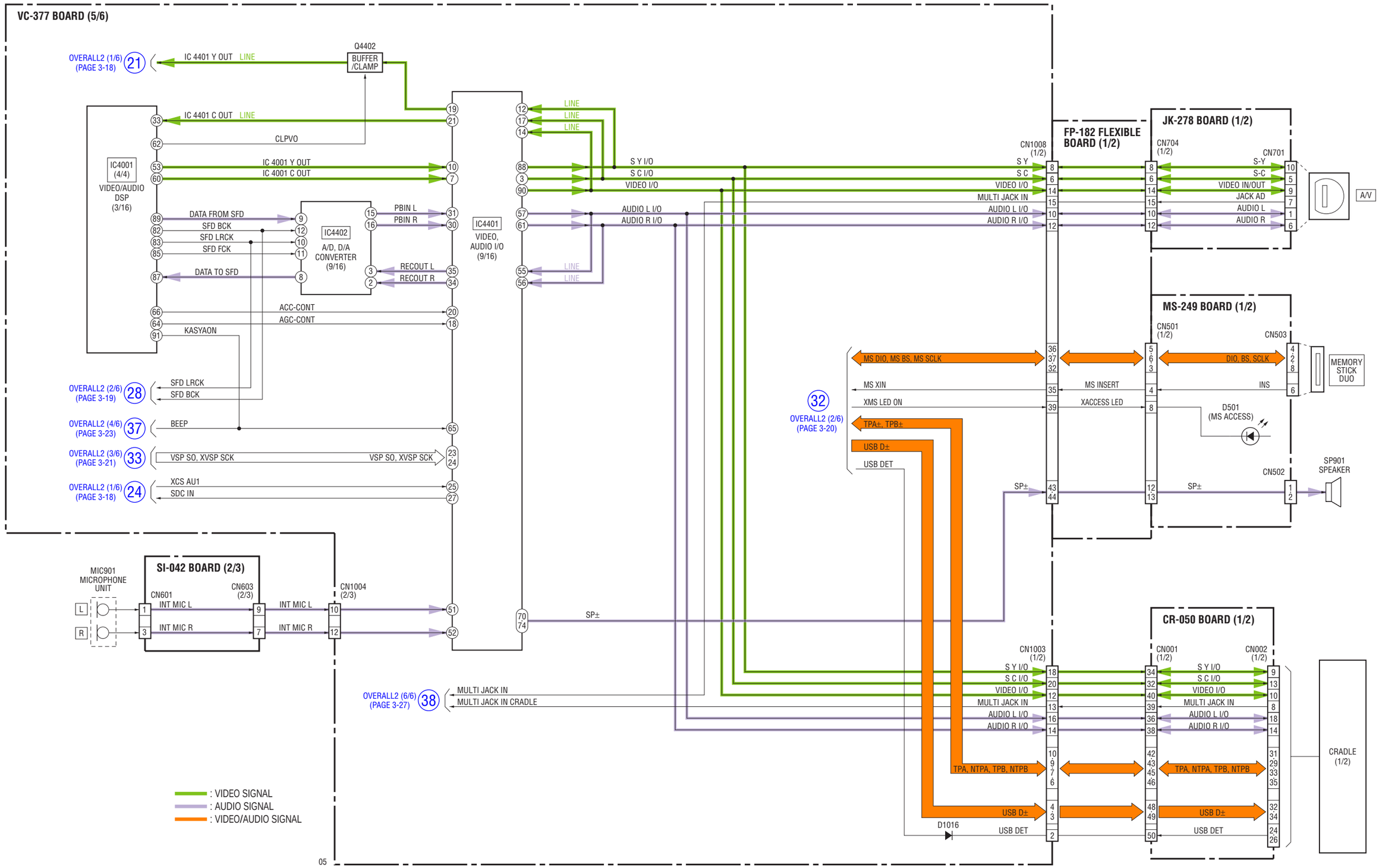
3-2-4. OVERALL BLOCK DIAGRAM (4/6) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



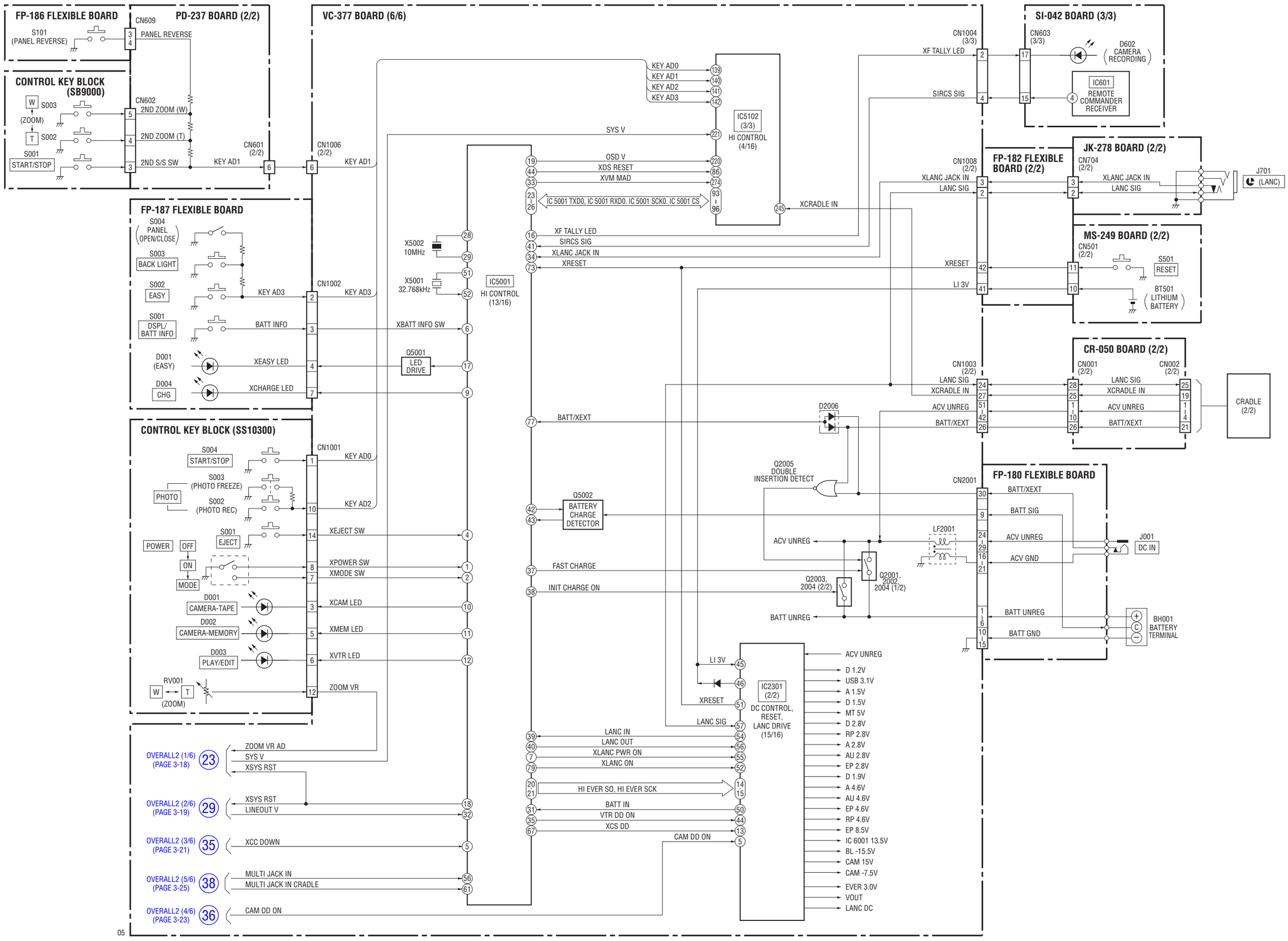
3-2-5. OVERALL BLOCK DIAGRAM (5/6) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



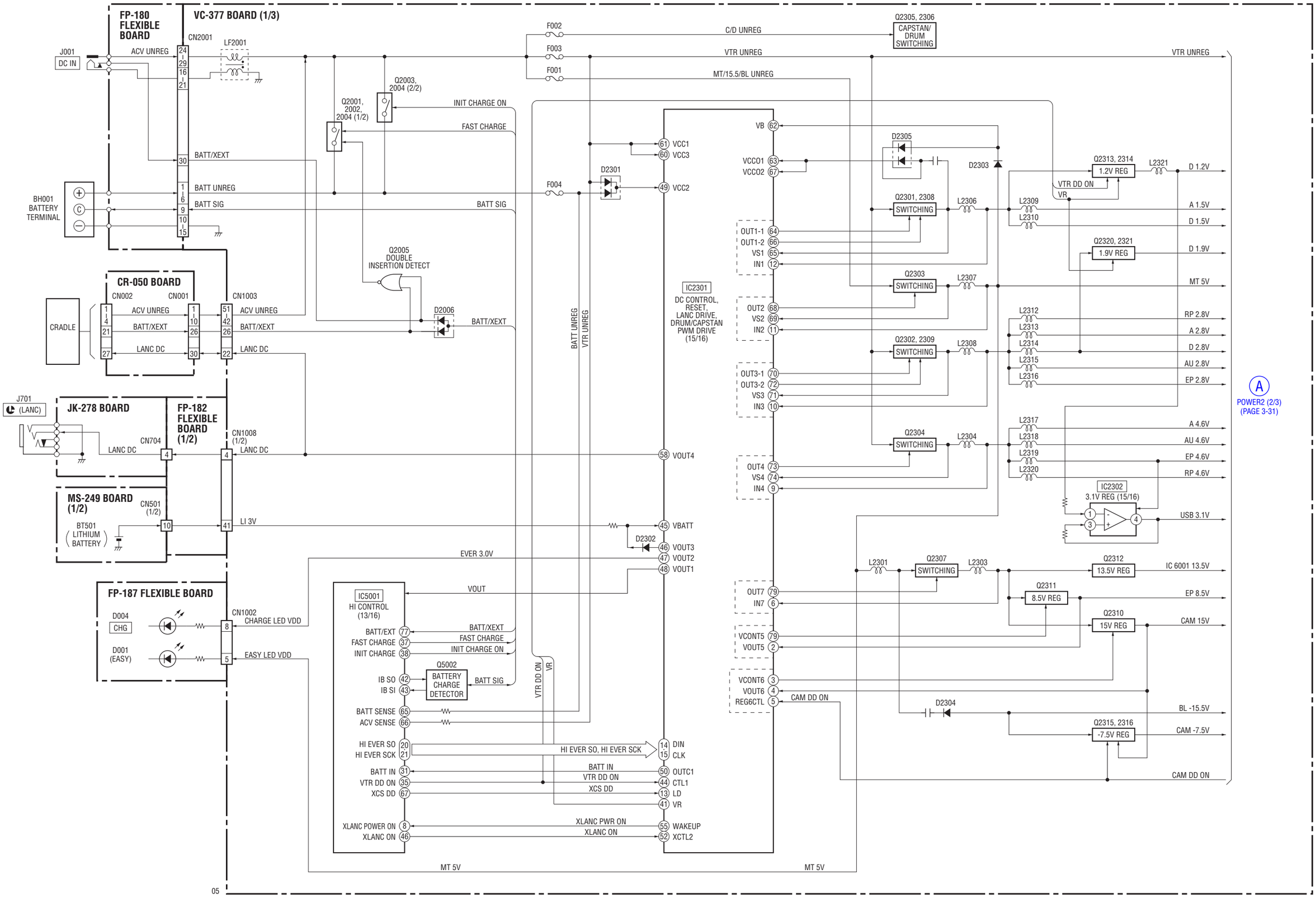
3-2-6. OVERALL BLOCK DIAGRAM (6/6) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



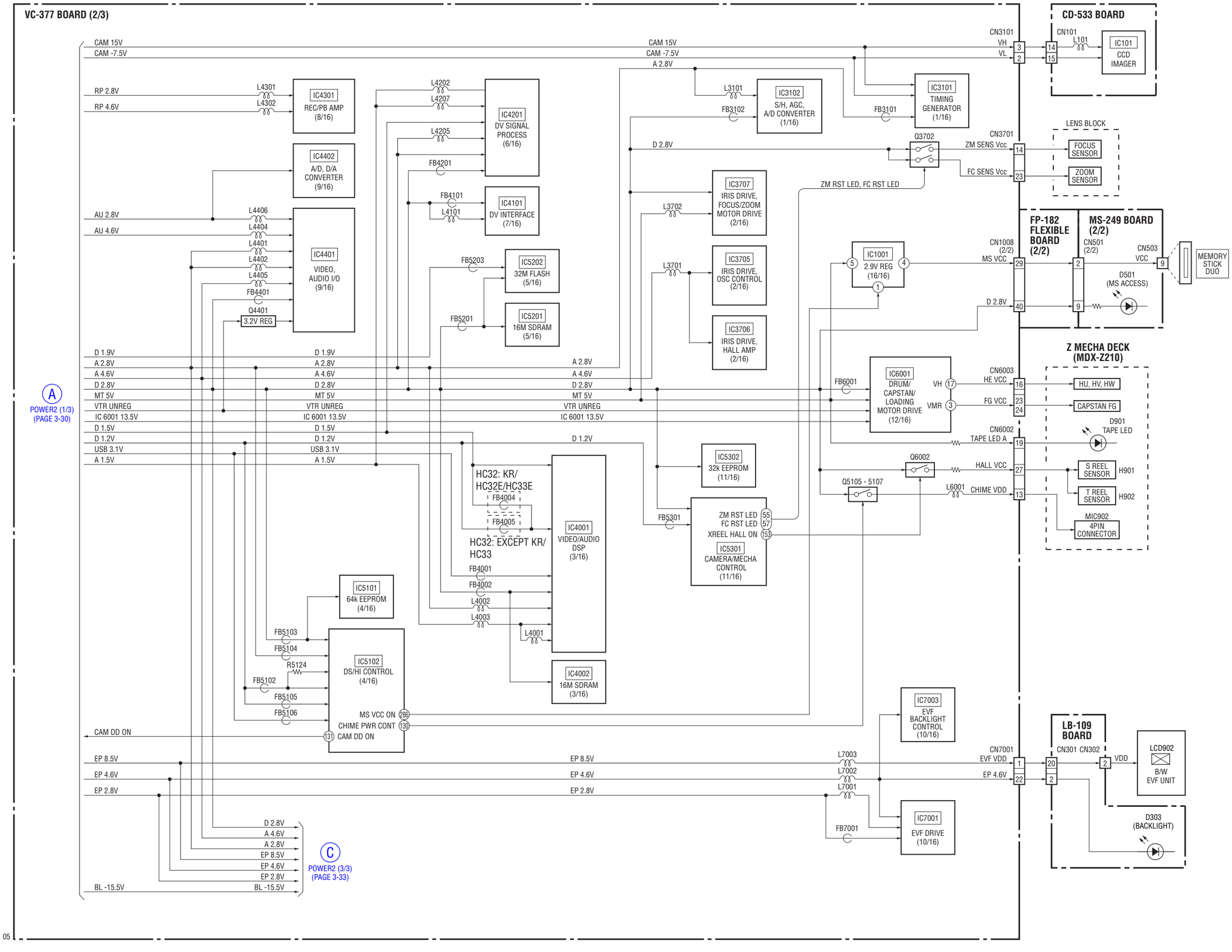
3-2-7. POWER BLOCK DIAGRAM (1/3) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



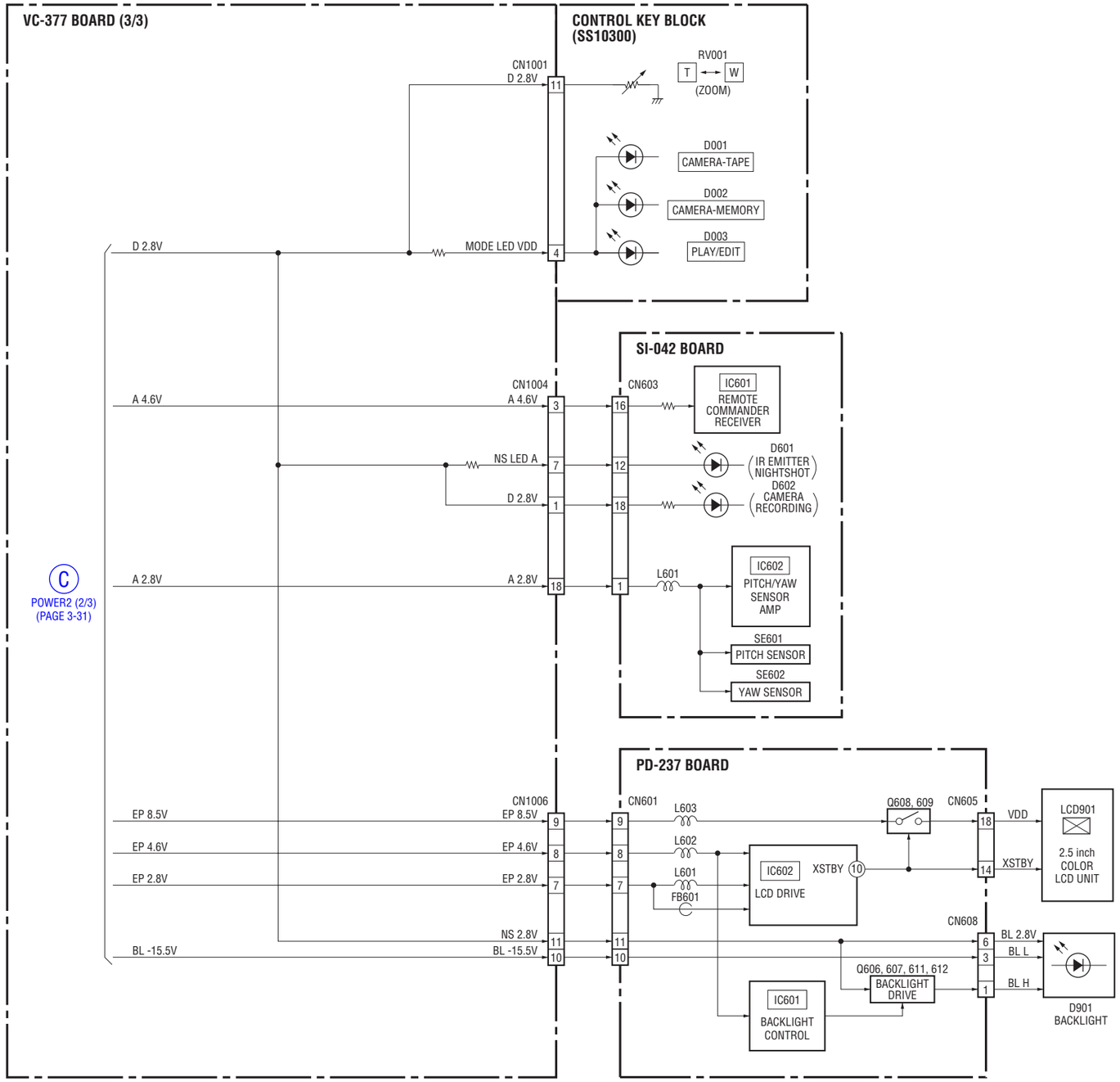
3-2-8. POWER BLOCK DIAGRAM (2/3) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.

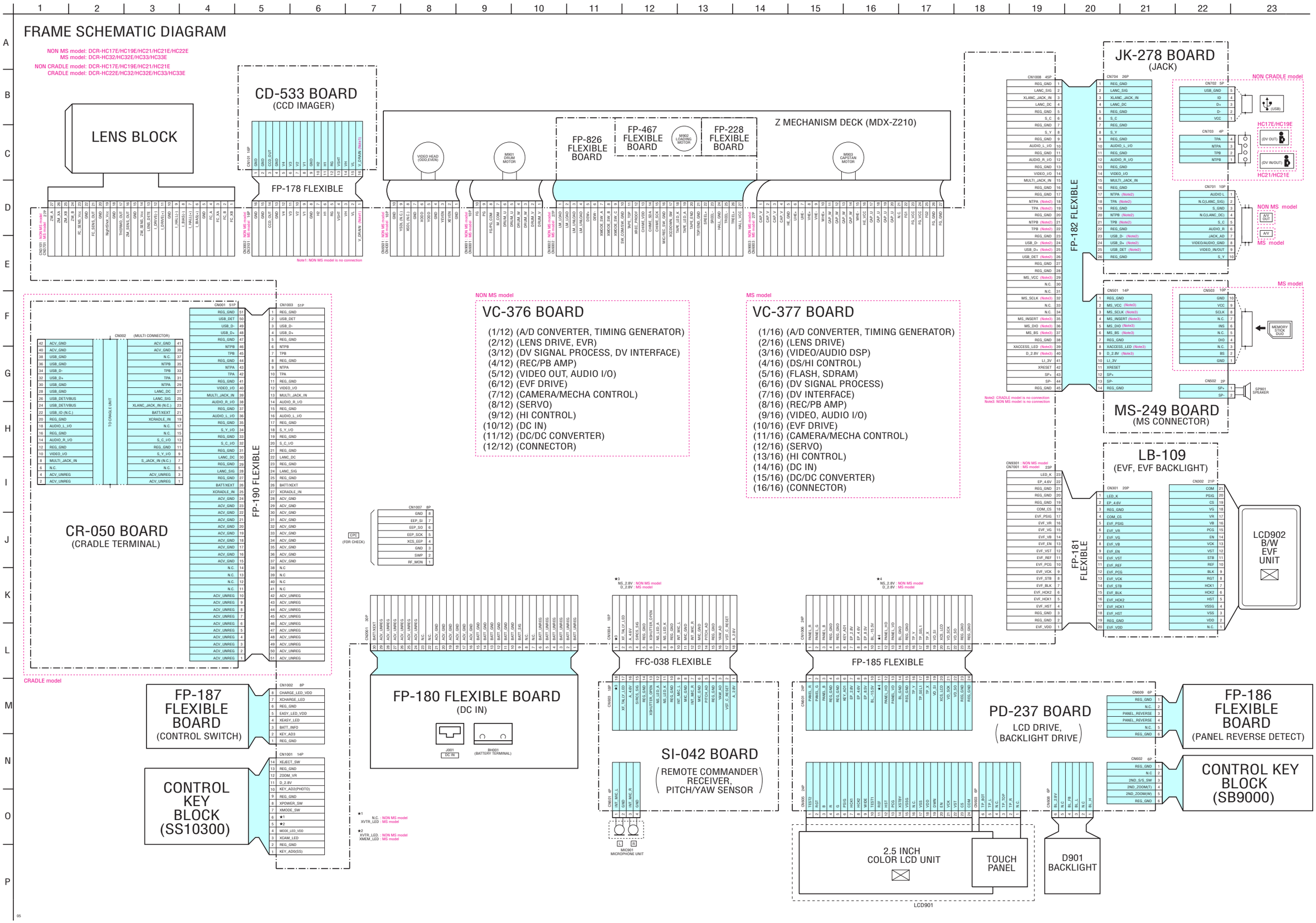


3-2-9. POWER BLOCK DIAGRAM (3/3) (MS model)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



4-1. FRAME SCHEMATIC DIAGRAM



4-2. SCHEMATIC DIAGRAMS

Link

CD-533 BOARD (CCD IMAGER)	LB-109 BOARD (EVF, EVF BACKLIGHT)
PD-237 BOARD (LCD DRIVE, BACKLIGHT DRIVE)	FP-186 FLEXIBLE BOARD (PANEL REVERSE DETECT)
CR-050 BOARD (CRADLE TERMINAL)	FP-180 FLEXIBLE BOARD (DC IN)
SI-042 BOARD (REMOTE COMMANDER RECEIVER, PITCH/YAW SENSOR)	FP-187 FLEXIBLE BOARD (CONTROL SWITCH)
FP-182 FLEXIBLE BOARD	FP-826, FP-467, FP-228 FLEXIBLE BOARD
JK-278 BOARD (JACK)	CONTROL KEY BLOCK (SS10300)
MS-249 BOARD (MS CONNECTOR)	CONTROL KEY BLOCK (SB9000)

COMMON NOTE FOR SCHEMATIC DIAGRAMS	WAVEFORMS

4-2. SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR SCHEMATIC DIAGRAMS
(In addition to this, the necessary note is printed in each block)

(For schematic diagrams)

- All capacitors are in μF unless otherwise noted. pF : μμF. 50 V or less are not indicated except for electrolytics and tantalums.
- Chip resistors are 1/10 W unless otherwise noted. kΩ=1000 Ω, MΩ=1000 kΩ.
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, Because it is damaged by the heat.
- Some chip part will be indicated as follows.

Example C541 22U TA A — Kinds of capacitor / Case size; L452 10UH 2520 — External dimensions (mm)

- Constants of resistors, capacitors, ICs and etc with XX indicate that they are not used. In such cases, the unused circuits may be indicated.
- Parts with ★ differ according to the model/destination. Refer to the mount table for each function.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Signal name
  XEDIT → $\overline{\text{EDIT}}$ PB/XREC → PB/$\overline{\text{REC}}$
- : non flammable resistor
- : fusible resistor
- : panel designation
- : B+ Line
- : B– Line
- : IN/OUT direction of (+,–) B LINE.
- : adjustment for repair.
- : not use circuit
- Circled numbers refer to waveforms.

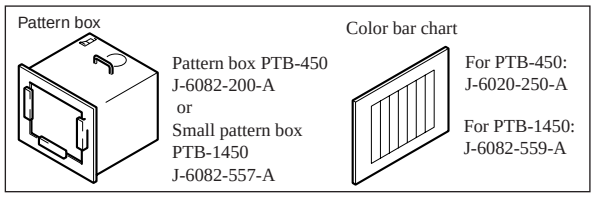
(Measuring conditions voltage and waveform)

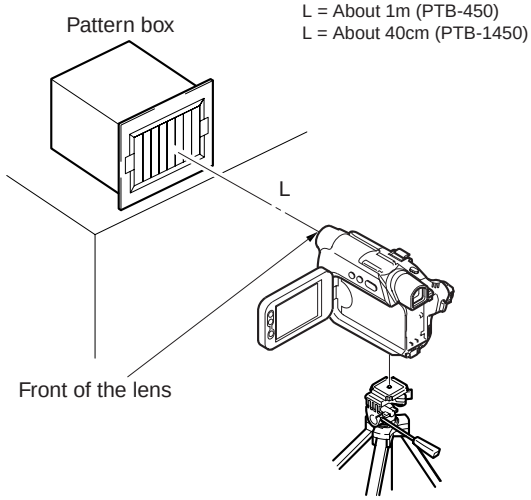
- Voltages and waveforms are measured between the measurement points and ground when camera shoots color bar chart of pattern box. They are reference values and reference waveforms. (VOM of DC 10 MΩ input impedance is used)
- Voltage values change depending upon input impedance of VOM used.)

Precautions for Replacement of CCD Imager

- The CD-533 board mounted as a repair part is not equipped with a CCD imager. When replacing this board, remove the CCD imager from the old one and mount it onto the new one.
- If the CCD imager has been replaced, carry out all the adjustments for the camera section.
- As the CCD imager may be damaged by static electricity from its structure, handle it carefully like for the MOS IC. In addition, ensure that the receiver is not covered with dusts nor exposed to strong light.

1. Connection





2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

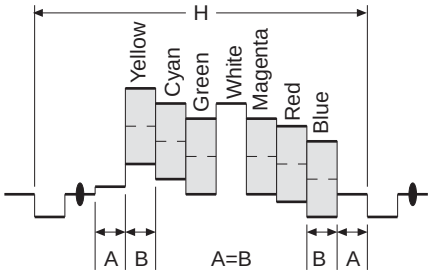


Fig. a (Video output terminal output waveform)

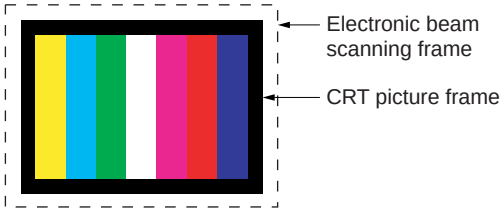


Fig.b (Picture on monitor TV)

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifie.

For Schematic Diagram
• Refer to page 4-81 for printed wiring board.

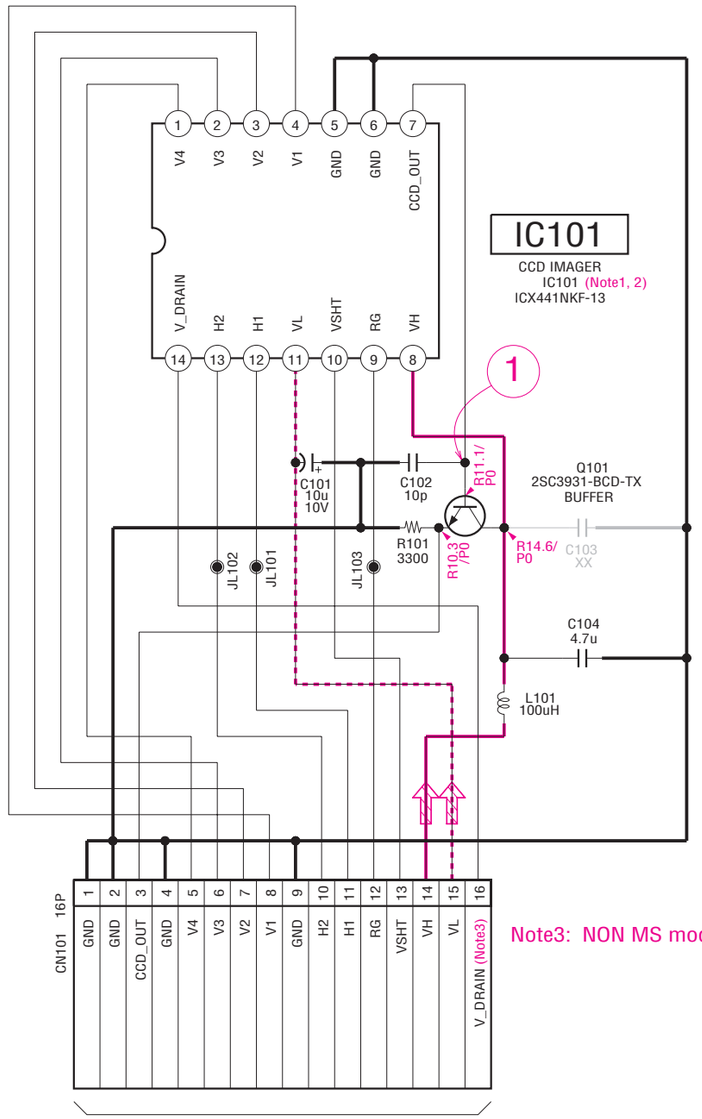
CD-533 BOARD

CCD IMAGER

XX MARK:NO MOUNT
NO MARK:REC/PB MODE
R:REC MODE
P:PB MODE

Note1: IC101 is not included in CD-533 complete board.

Note2: Voltage and Waveform of mounted IC101 on CD-533 board can not be measured, because this is mounted by side of the lens.



Note3: NON MS model is no connection.

VC-376 (1/12) CN3002 (THROUGH THE FP-178 FLEXIBLE) (PAGE 4-9 of LEVEL3) — NON MS model

VC-377 (1/16) CN3101 (THROUGH THE FP-178 FLEXIBLE) (PAGE 4-33 of LEVEL3) — MS model

NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

05

Schematic diagrams of the VC-376/377 board are not shown.
Pages from 4-9 to 4-64 are not shown.

For Schematic Diagram
• Refer to page 4-91 for printed wiring board.

PD-237 BOARD

LCD DRIVE, BACKLIGHT DRIVE

XX MARK:NO MOUNT
NO MARK:REC/PB MODE

★1
NS_2.8V : NON MS model
D_2.8V : MS model

NON MS model
VC-376 (12/12) CN1006
(THROUGH THE FP-185 FLEXIBLE)
(PAGE 4-32 of LEVEL3)

MS model
VC-377 (16/16) CN1006
(THROUGH THE FP-185 FLEXIBLE)
(PAGE 4-64 of LEVEL3)

CONTROL KEY BLOCK (SB9000)
LND001-LND006
(PAGE 4-78 of LEVEL2)

FP-186 FLEXIBLE
LND101-LND106
(PAGE 4-73 of LEVEL2)

LCD901 (2/2) TOUCH PANEL (With LCD UNIT)

CN601 24P: PANEL_R 1, PANEL_G 2, PANEL_B 3, REG_GND 4, REG_GND 5, KEY_AD1 6, EP_2.8V 7, EP_4.6V 8, EP_8.5V 9, BL_-15.5V 10, ★1 11, PANEL_HD 12, PANEL_VD 13, BL_GND 14, REG_GND 15, TP_Y 16, TP_SEL1 17, TP_X 18, VD_SI 19, XCS_LCD 20, VD_SCK 21, VD_SO 22, REG_GND 23, REG_GND 24

CN602 6P: REG_GND 1, N.C 2, 2ND_S/S_SW 3, 2ND_ZOOM(T) 4, 2ND_ZOOM(W) 5, REG_GND 6

CN609 6P: REG_GND 1, N.C 2, PANEL_REVERSE 3, PANEL_REVERSE 4, N.C 5, REG_GND 6

CN603 6P: TP_BOT 6, TP_L 5, N.C. 4, TP_TOP 3, TP_R 2, N.C. 1

L601 10uH, L602 10uH, L603 10uH, FB601 0uH

C603 10u 6.3V, C604 22u 4V, C605 XX, C606 1u, C609 10u, C611 22u 10V, C617 XX, C618 2.2u, C619 2.2u, C620 XX, C621 10u 16V, C622 4.7u, C623 10u, C624 0.1u, C625 0.01u, C626 1u, C627 0.1u, C630 XX, C631 1u, C632 10u 6.3V, C633 4.7u, C634 1M, C601 XX, C602 2200p, C607 XX, C608 0.1u, C610 0.1u, C612 560p, C613 XX

C614 0.01u, C615 0.01u, C616 0.01u

R603 XX, R604 XX, R605 47 ±0.5%, R606 220k ±0.5%, R607 XX, R608 47k ±0.5%, R609 68k, R610 2200, R611 XX, R612 470, R613 91k ±0.5%, R614 10k ±0.5%, R615 4700, R616 2200, R617 1k, R618 XX, R619 47 ±0.5%, R620 10k, R623 47 ±0.5%, R624 100k, R625 0, R626 1200, R627 1500, R633 XX, R634 1M, R636 0, R637 120k, R638 0, R639 0, R642 47k, R643 47k

RB601 10 ×4

D601 XX, D602 EDZ-TE61-5.6B, D603 XX, D604 XX

Q601,602 TOUCH PANEL I/F
Q601 XP4216-TXE
Q602 XP4116-TXE
Q603 XX
Q606 2SA1576A-T106-QR
Q607 2SA1576A-T106-QR
Q608 UNR32A300LS0 SWITCH
Q609 NDS356AP B+ SWITCH
Q610 2SA2078OOLS0 SWITCH
Q611 2SA1576A-T106-QR
Q612 EMX112R BACKLIGHT DRIVE

Q606,607,611 BACKLIGHT DRIVE

IC602
LCD DRIVE
IC602
CXM3006CR-T4
Filter1, VCC1, RIN, GIN, BIN, EXTDA, BLDET, XLED, REF, COMREF, COMOUT, COMDA
Filter2, GND1, OPOUT, OPIN, FVCC, SO, XCS, XSCK, SI, VDD, SCAN, HD
VP, VCC2, VB, VG, VR, GND2, PWM, WIDE, VST, VDD, VCK, VSS
VXD, XVMRT/CLKIN, XCLR, VSS, RGT, HCK1, HCK2, HST, PCG, XSTBY, DWN, EN

IC601
BACKLIGHT CONTROL
IC601
NJM12904V(TE2)
A_OUT, A_IN-, A_IN+, GND, Vcc, B_OUT, B_IN-, B_IN+

CN605 24P: COM 24, CS 23, VST 22, VCK 21, EN 20, DWN 19, VDD 18, VSS 17, N.C. 16, VSSG 15, XSTBY 14, PCG 13, HST 12, REF 11, TEST1 10, WIDE 9, HCK2 8, HCK1 7, PSIG 6, G 5, R 4, B 3, RGT 2, TEST2 1

CN608 6P: BL_2.8V 6, NC 5, BL_FB 4, BL_L 3, NC 2, BL_H 1

D901 BACKLIGHT

LCD901 (1/2) 2.5 INCH COLOR LCD UNIT (With TOUCH PANEL)

LND601 CH_GND

PANEL_XHD, PANEL_XVD, VD_SI, XCS_LCD, VD_SCK, VD_SO, REF, EXTDA, BL_ON, VST, VCK, EN, DWN, XSTBY, PCG, HST, HCK1, HCK2, RGT, WIDE, VP, VG, VR, VB

NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

05

CR-050 BOARD

:CRADLE model

CRADLE TERMINAL

HC22E

VC-376
(12/12)
CN1003
(THROUGH THE FP-190 FLEXIBLE)
(PAGE 4-32 of LEVEL3)

MS model

VC-377
(16/16)
CN1003
(THROUGH THE FP-190 FLEXIBLE)
(PAGE 4-64 of LEVEL3)

CN001 51P

REG_GND	51
USB_DET	50
USB_D-	49
USB_D+	48
REG_GND	47
NTPB	46
TPB	45
REG_GND	44
NTPA	43
TPA	42
REG_GND	41
VIDEO_I/O	40
MULTI_JACK_IN	39
AUDIO_R_I/O	38
REG_GND	37
AUDIO_L_I/O	36
REG_GND	35
S_Y_I/O	34
REG_GND	33
S_C_I/O	32
REG_GND	31
LANC_DC	30
REG_GND	29
LANC_SIG	28
REG_GND	27
BATT/XEXT	26
XCRADLE_IN	25
ACV_GND	24
ACV_GND	23
ACV_GND	22
ACV_GND	21
ACV_GND	20
ACV_GND	19
ACV_GND	18
ACV_GND	17
ACV_GND	16
ACV_GND	15
N.C.	14
N.C.	13
N.C.	12
N.C.	11
ACV_UNREG	10
ACV_UNREG	9
ACV_UNREG	8
ACV_UNREG	7
ACV_UNREG	6
ACV_UNREG	5
ACV_UNREG	4
ACV_UNREG	3
ACV_UNREG	2
ACV_UNREG	1

Note: CN002 (multi connector) is not supplied,
but this is included in CR-050 complete board.

D006
MAZW068H0LS0

D005
MAZB068H0LS0

LND001
REG_GND

D007
EDZ TE61 6.8B

CN002 (MULTI CONNECTOR)

41	39	37	35	33	31	29	27	25	23	21	19	17	15	13	11	9	7	5	3	1		
ACV_GND	ACV_GND	N.C.	NTPB	TPB	TPA	NTPA	LANC_DC	LANC_SIG	XLANC_JACK_IN (N.C.)	BATT/XEXT	XCRADLE_IN	N.C.	N.C.	S_C_I/O	REG_GND	S_Y_I/O	S_JACK_IN (N.C.)	N.C.	ACV_UNREG	ACV_UNREG		

44 TO CRADLE UNIT 43

42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2		
ACV_GND	ACV_GND	USB_GND	USB_GND	USB_D-	USB_D+	USB_GND	USB_GND	USB_DET/VBUS	USB_DET/VBUS	USB_ID (N.C.)	REG_GND	AUDIO_L_I/O	REG_GND	AUDIO_R_I/O	REG_GND	VIDEO_I/O	MULTI_JACK_IN	N.C.	ACV_UNREG	ACV_UNREG		

D001
MAZB068H0LS0

D002
MAZB068H0LS0

D003
MAZB068H0LS0

CRADLE model: DCR-HC22E/HC32/HC32E/HC33/HC33E
MS model: DCR-HC32/HC32E/HC33/HC33E

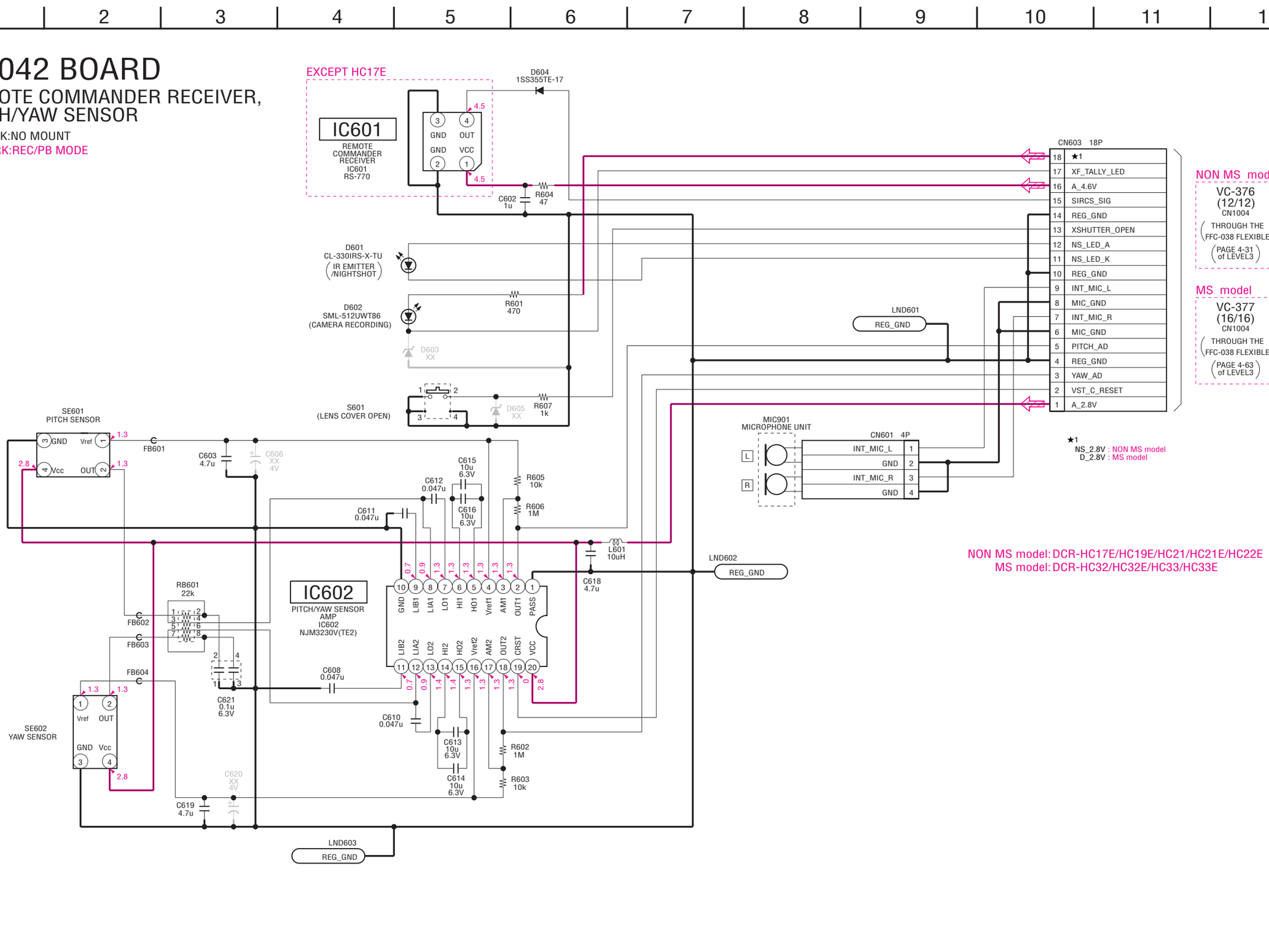
05

For Schematic Diagram
• Refer to page 4-93 for printed wiring board.

SI-042 BOARD

REMOTE COMMANDER RECEIVER, PITCH/YAW SENSOR

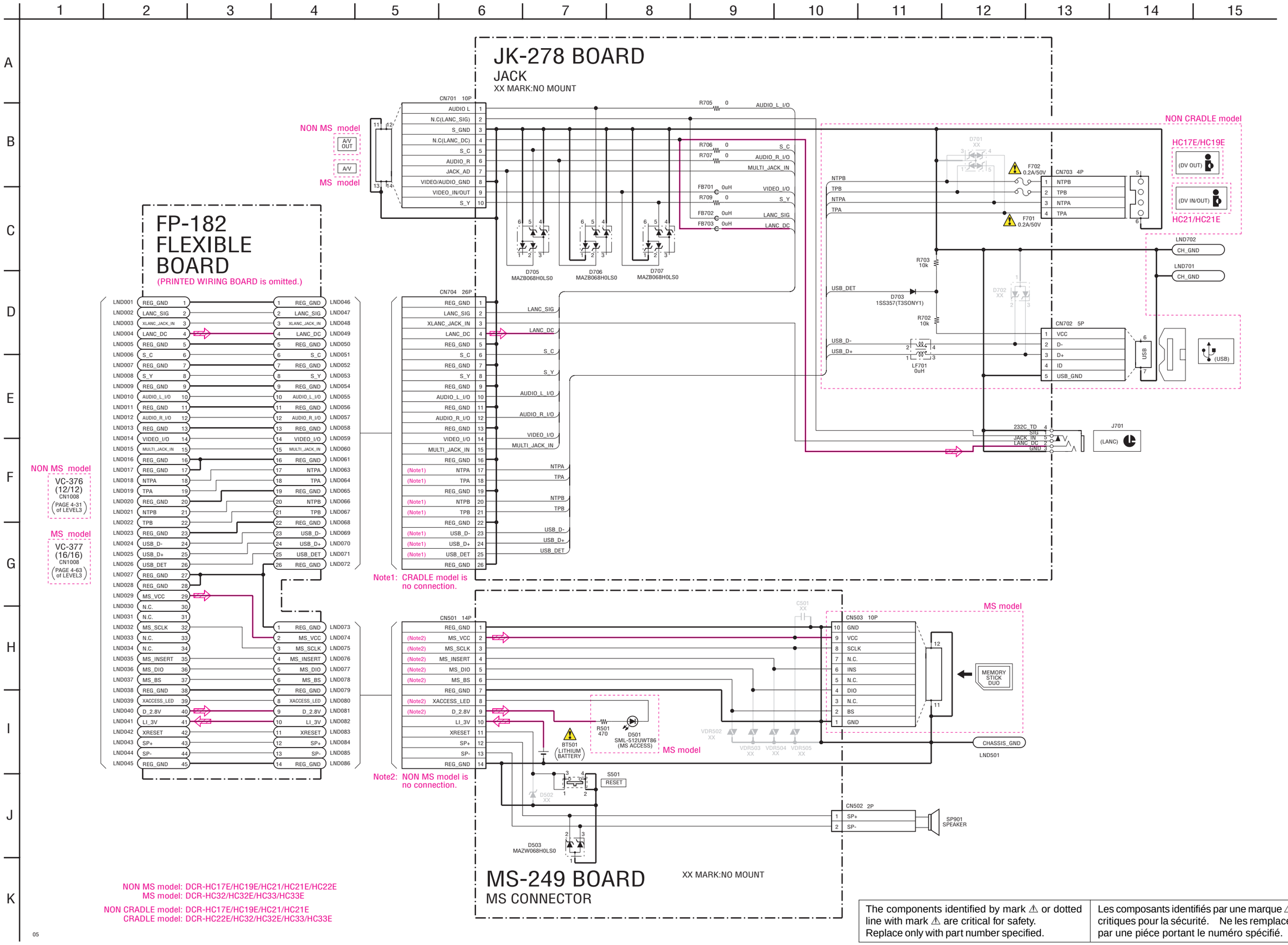
XX MARK:NO MOUNT
NO MARK:REC/PB MODE



NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

For Schematic Diagram

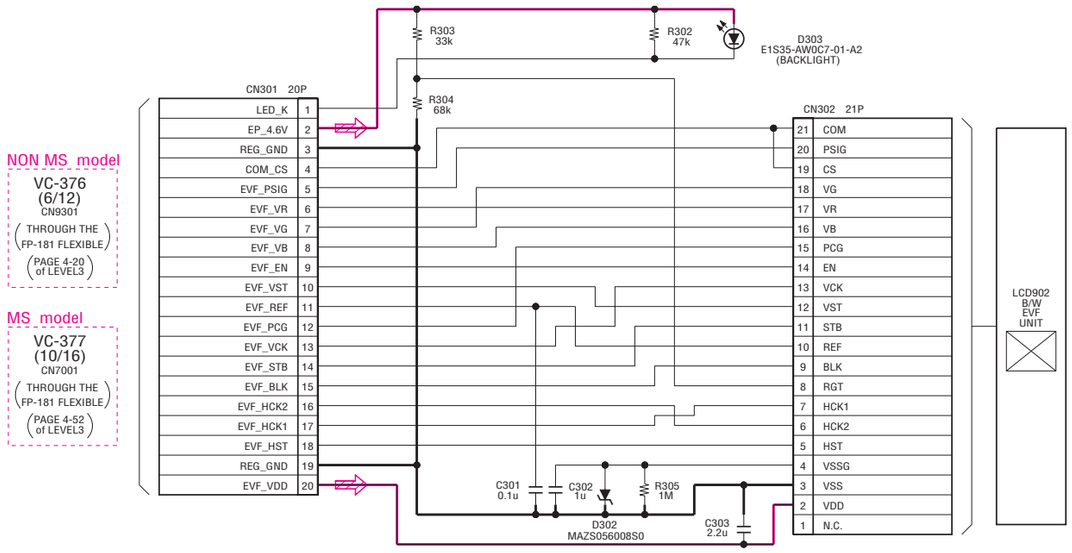
• Refer to page 4-95 for printed wiring board.



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piéce portant le numéro spécifié.

For Schematic Diagram
• Refer to page 4-93 for printed wiring board.

LB-109 BOARD
EVF, EVF BACKLIGHT



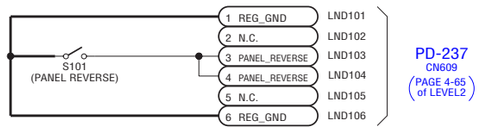
NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

05

For Schematic Diagram
• Refer to page 4-97 for printed wiring board.

FP-186 FLEXIBLE BOARD
PANEL REVERSE DETECT

XX MARK:NO MOUNT
NO MARK:REC/PB MODE

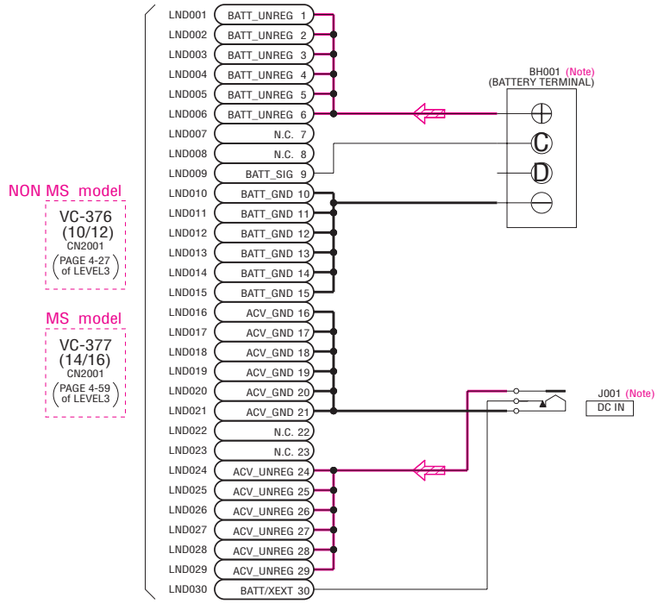


05

For Schematic Diagram
• Refer to page 4-97 for printed wiring board.

FP-180 FLEXIBLE BOARD
DC IN

Note: BH001 and J001 are not included in FP-180 flexible board.

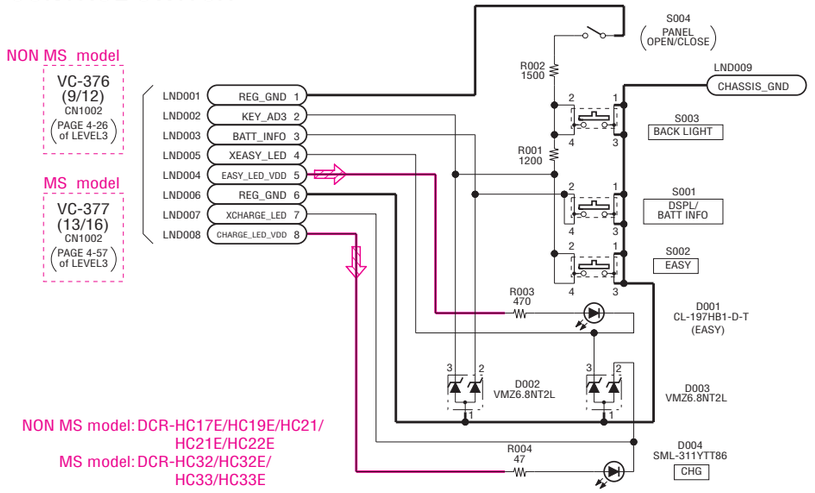


NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

05

For Schematic Diagram
• Refer to page 4-97 for printed wiring board.

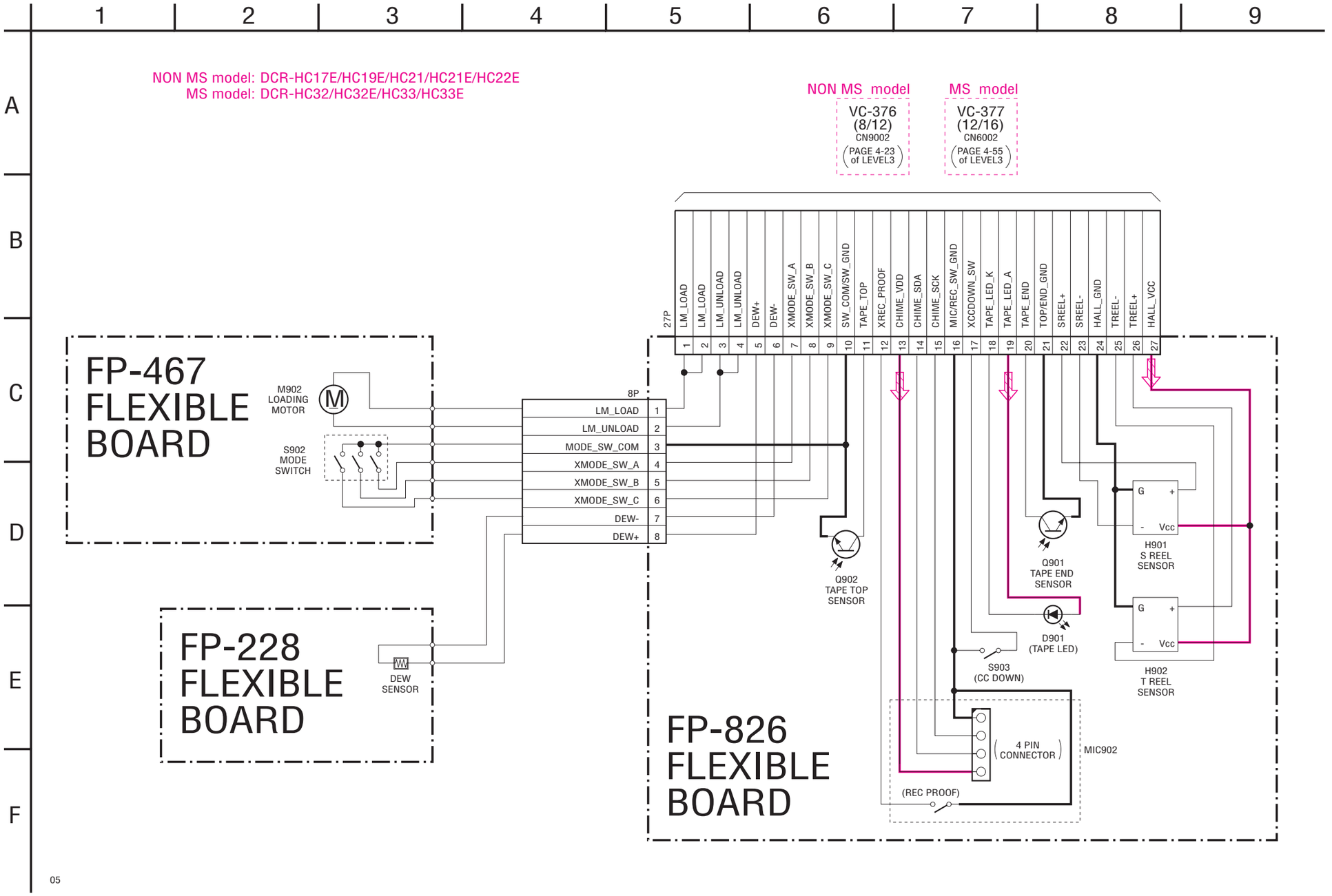
FP-187 FLEXIBLE BOARD
CONTROL SWITCH



NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

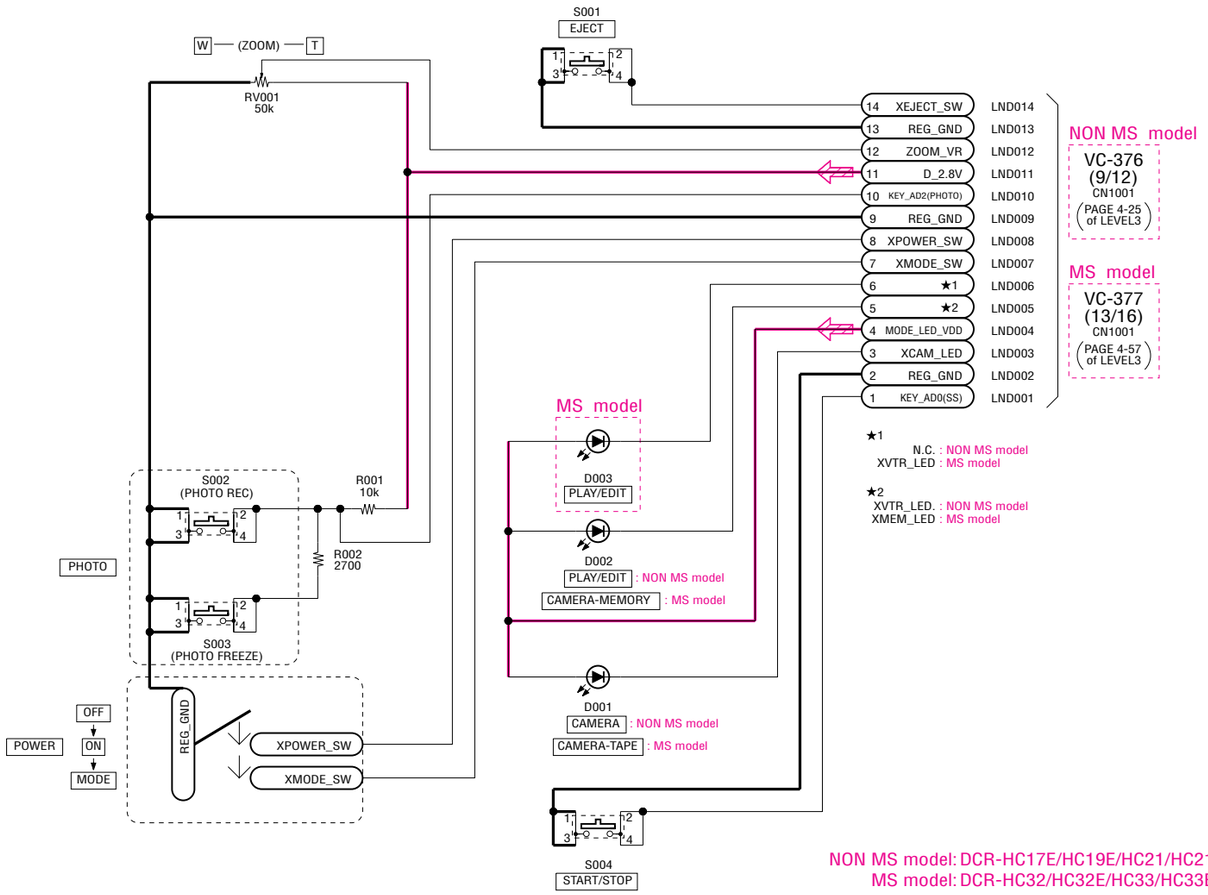
05

For Schematic Diagram
• Refer to page 4-99 for printed wiring board.



CONTROL KEY BLOCK (SS10300)

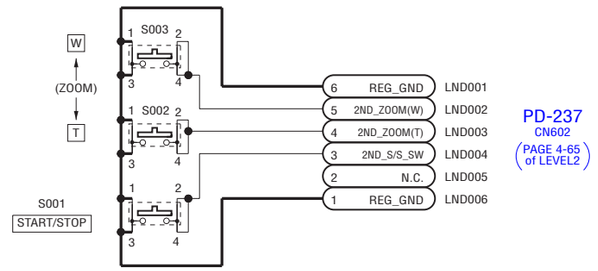
CONTROL KEY BLOCK (SS10300) is replaced as block, so that PRINTED WIRING BOARD is omitted.



NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

CONTROL KEY BLOCK (SB9000)

CONTROL KEY BLOCK (SB9000) is replaced as block, so that PRINTED WIRING BOARD is omitted.



4-3. PRINTED WIRING BOARDS

Link

- CD-533 BOARD
- JK-278 BOARD
- PD-237 BOARD
- MS-249 BOARD
- CR-050 BOARD
- FP-180, FP-186, FP-187 FLEXIBLE BOARD
- SI-042 BOARD
- FP-826, FP-467, FP-228 FLEXIBLE BOARD
- LB-109 BOARD

- COMMON NOTE FOR PRINTED WIRING BOARDS
- WAVEFORMS
- MOUNTED PARTS LOCATION
- CIRCUIT BOARDS LOCATION
- FLEXIBLE BOARDS LOCATION

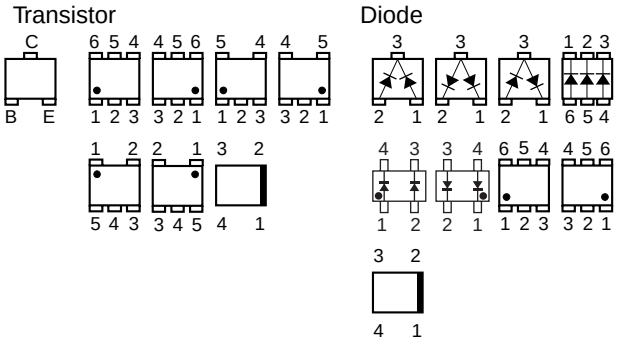
Board Name	Function
CD-533	CCD IMAGER
PD-237	LCD DRIVE, BACKLIGHT DRIVE
CR-050	CRADLE TERMINAL
SI-042	REMOTE COMMANDER RECEIVER, PITCH/YAW SENSOR
LB-109	EVF, EVF BACKLIGHT
JK-278	JACK
MS-249	MS CONNECTOR
FP-180	DC IN
FP-186	PANEL REVERSE DETECT
FP-187	CONTROL SWITCH

4-3. PRINTED WIRING BOARDS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS

- : Uses unleaded solder.
- : Circuit board
  : Flexible board
  Pattern from the side which enables seeing.
  : pattern of the rear side
  (The other layers' patterns are not indicated)
- Through hole is omitted.
- Circled numbers refer to waveforms.
- There are a few cases that the part printed on diagram isn't mounted in this model.
- : panel designation

- Chip parts.



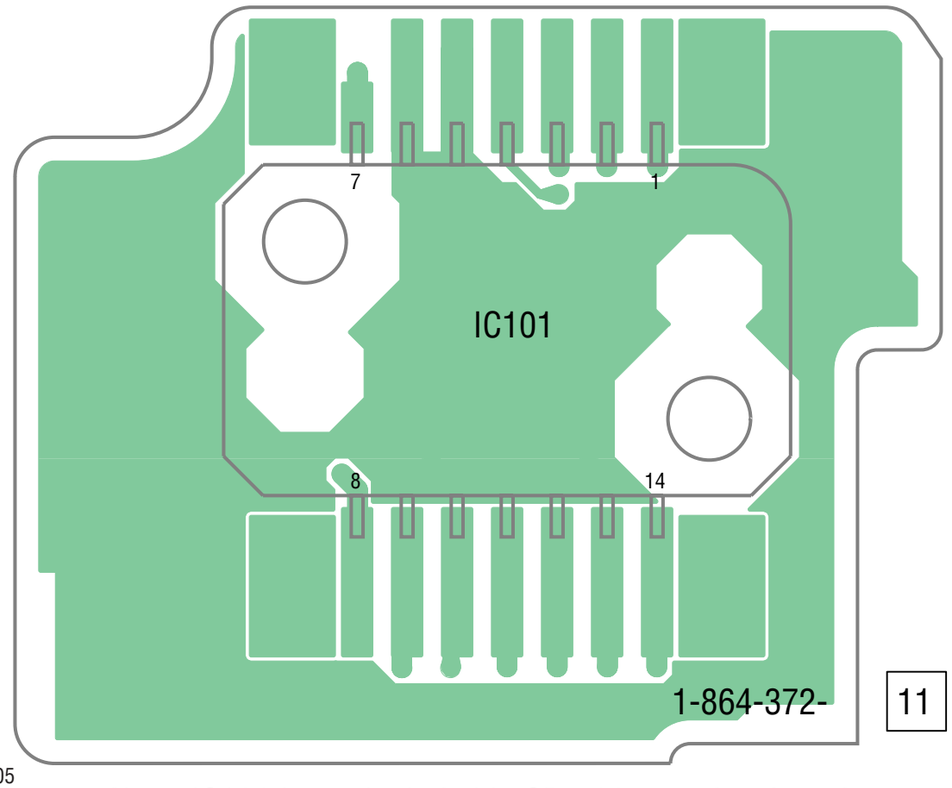
BOARD INFORMATION

Board Name	Waveform (Shown on Page)	Parts Location (Shown on Page)	Pattern	
			Total Number of Layers	Layers Not Indicated
CD-533	4-101	–	2 layers	–
PD-237	4-112	4-117	2 layers	–
CR-050	–	–	2 layers	–
SI-042	–	4-117	2 layers	–
LB-109	–	–	2 layers	–
JK-278	–	4-117	2 layers	–
MS-249	–	–	2 layers	–
FP-180 Flexible	–	–	1 layer	–
FP-186 Flexible	–	–	1 layer	–
FP-187 Flexible	–	–	1 layer	–
FP-826 Flexible	–	–	1 layer	–
FP-467 Flexible	–	–	1 layer	–
FP-228 Flexible	–	–	1 layer	–

Note for Printed Wiring Board (See page 4-79).

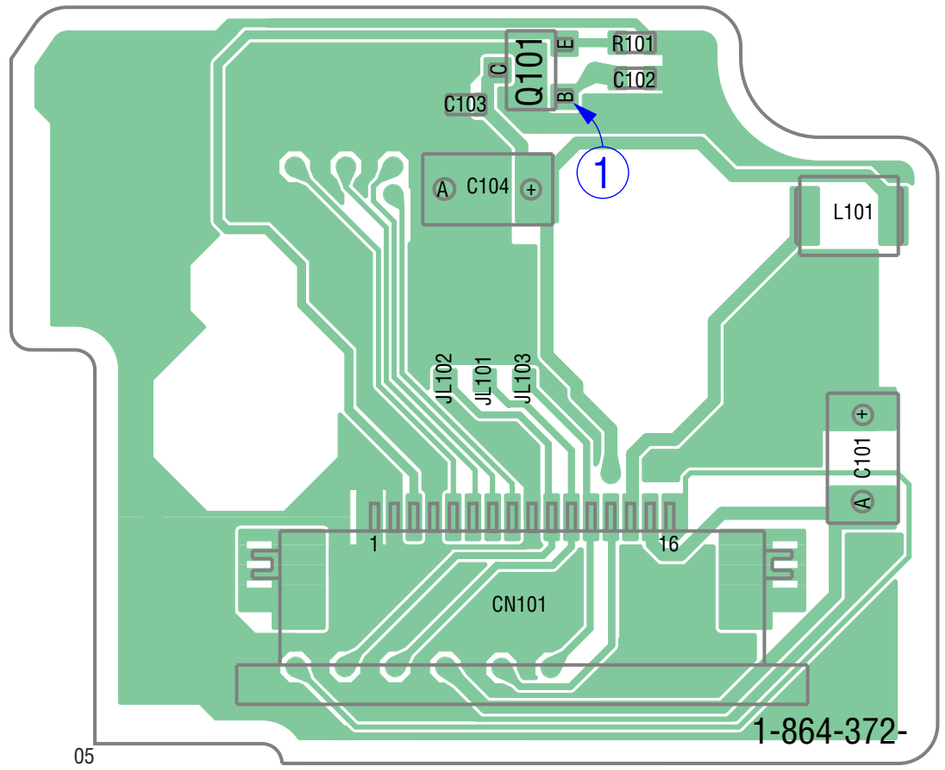
: Uses unleaded solder.

CD-533 BOARD (SIDE A)



Note: IC101 is not included in CD-533 complete board.

CD-533 BOARD (SIDE B)



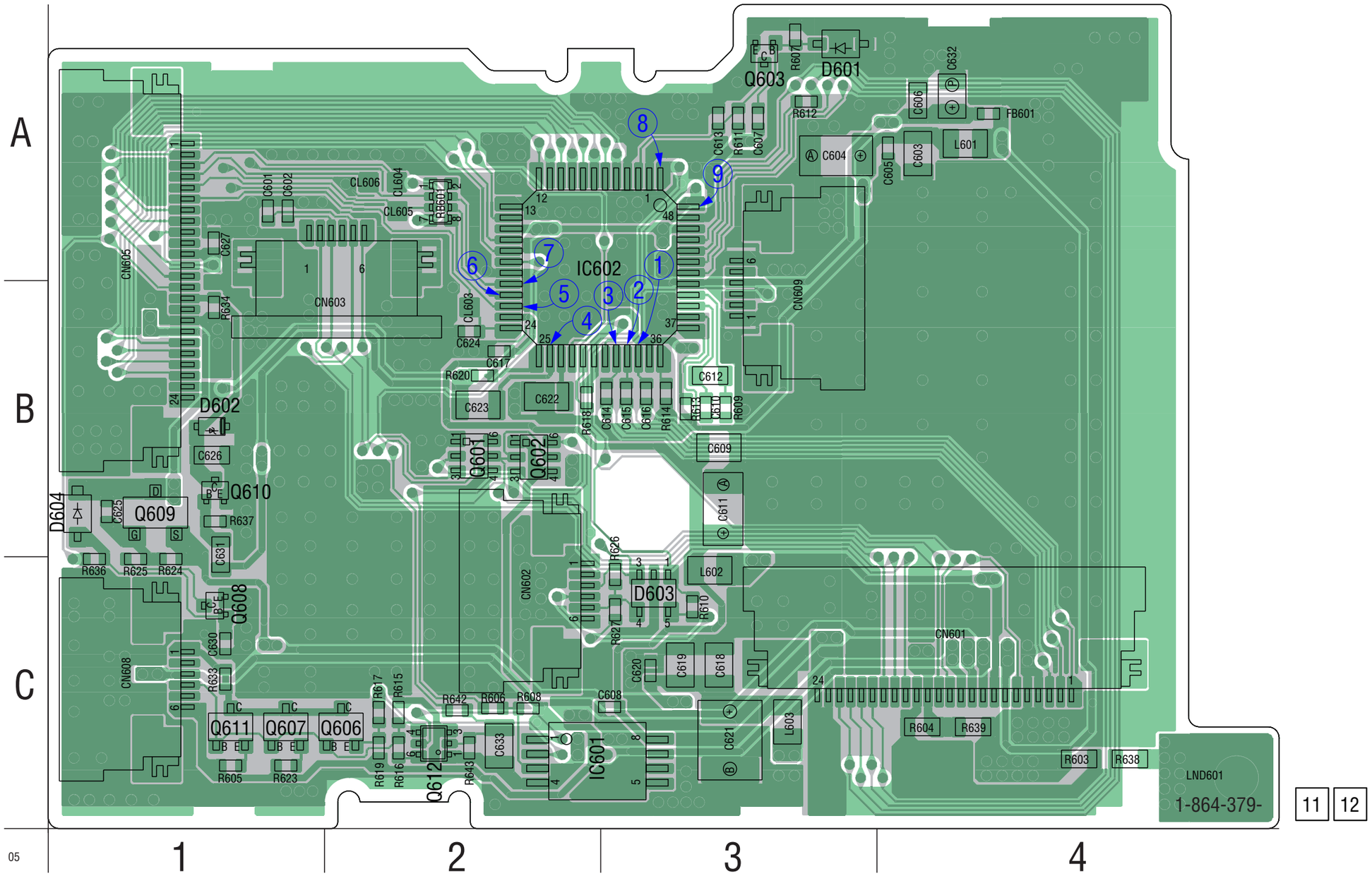
Printed wiring boards of the VC-376/377 board are not shown.
Pages from 4-83 to 4-90 are not shown.

PD-237

Note for Printed Wiring Board (See page 4-79).

: Uses unleaded solder.

PD-237 BOARD



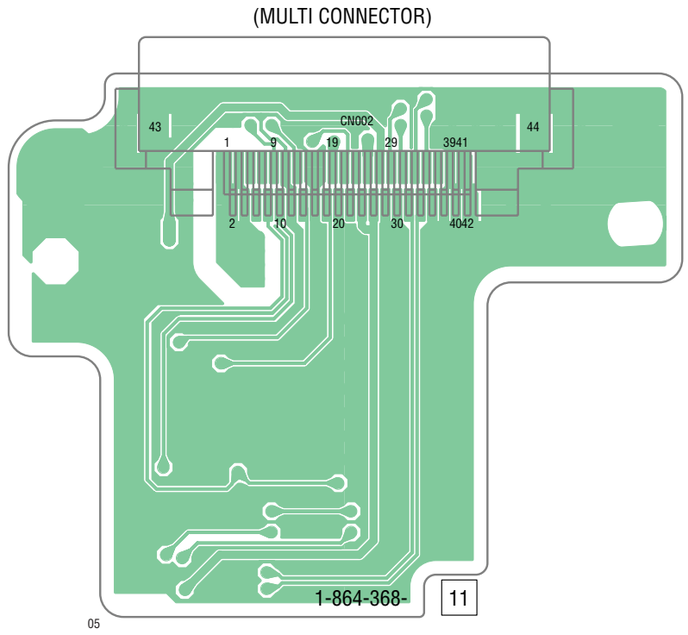
Note for Printed Wiring Board (See page 4-79).

CR-050

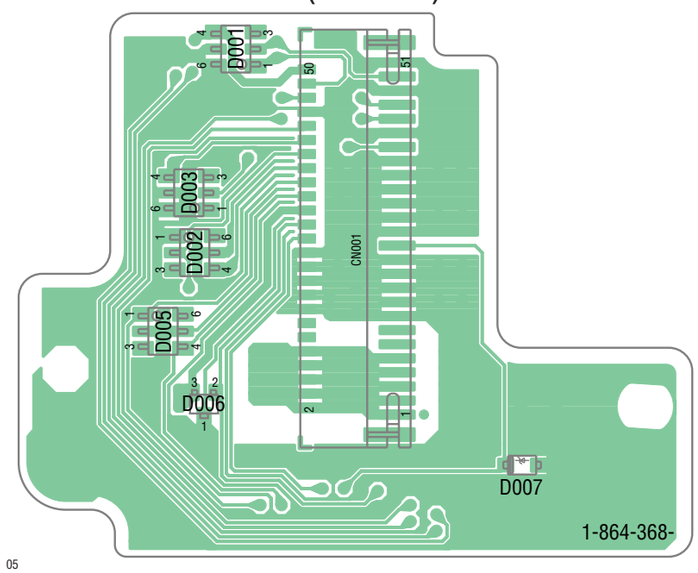
: Uses unleaded solder.

CR-050 BOARD (SIDE A)

Note: CN002 (multi connector) is not supplied,
but this is included in CR-050 complete board.



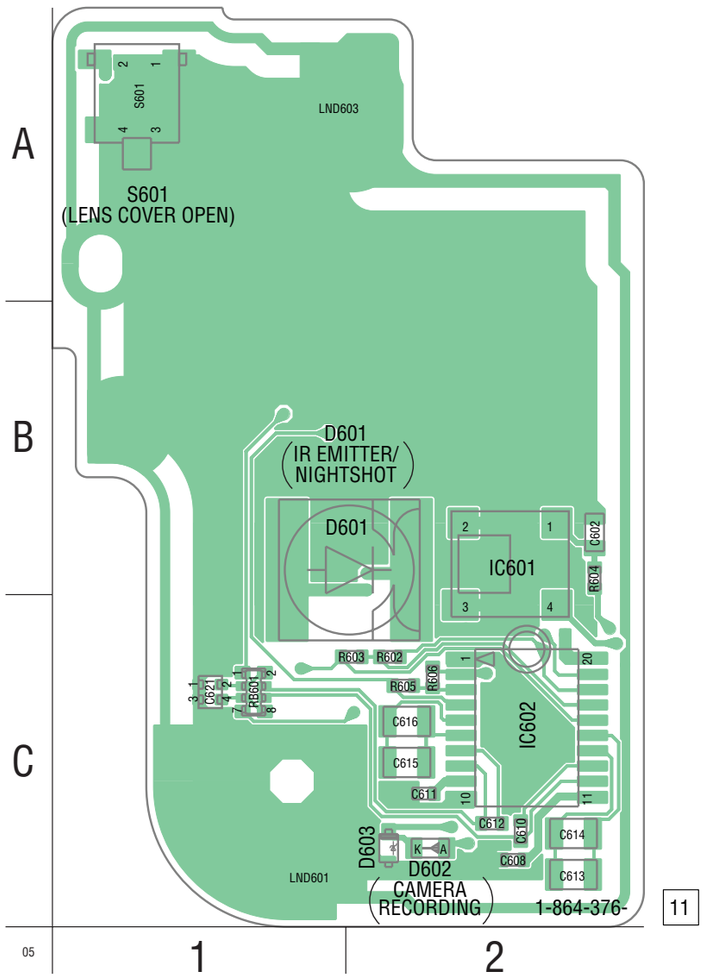
CR-050 BOARD (SIDE B)



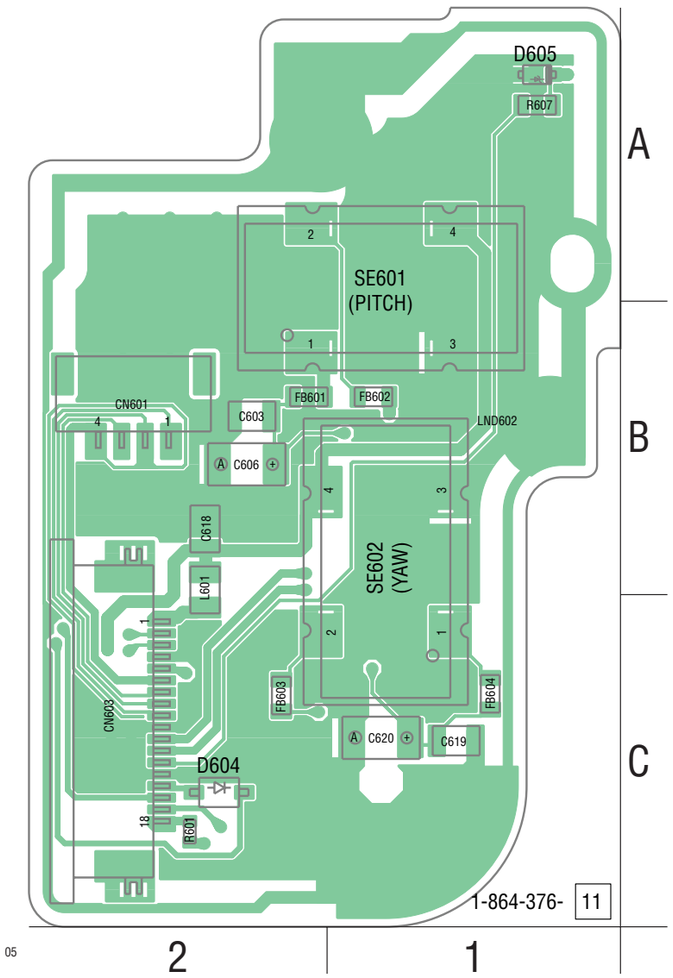
SI-042

: Uses unleaded solder.

SI-042 BOARD (SIDE A)



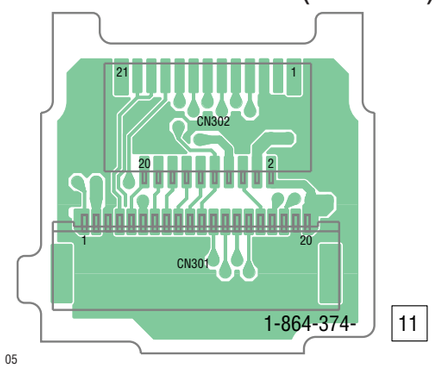
SI-042 BOARD (SIDE B)



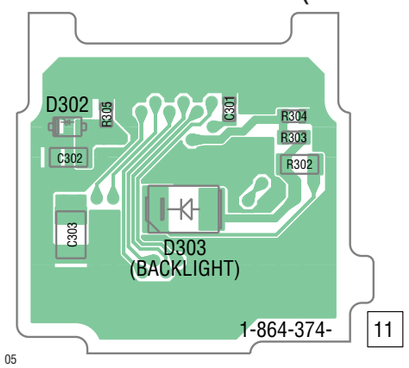
LB-109

: Uses unleaded solder.

LB-109 BOARD (SIDE A)



LB-109 BOARD (SIDE B)



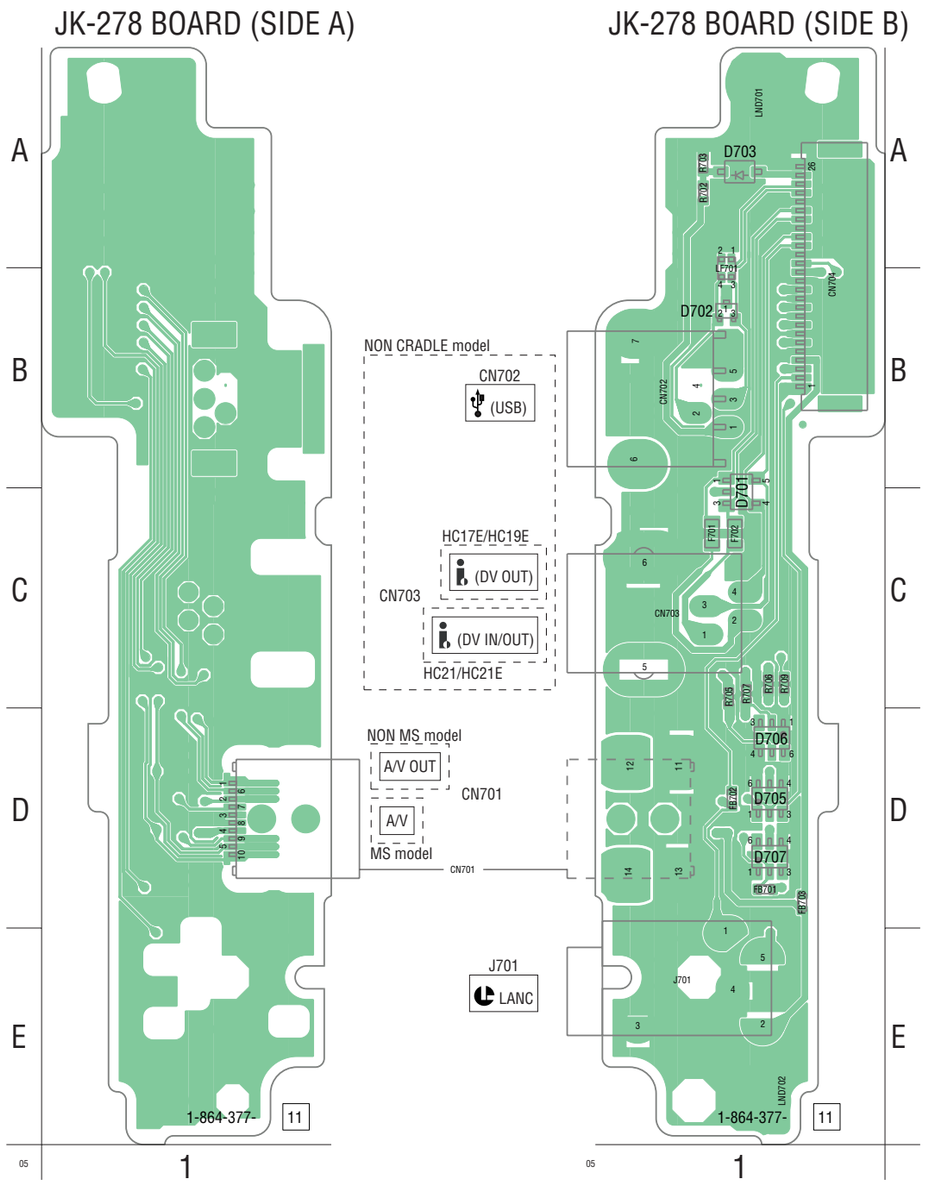
Note for Printed Wiring Board (See page 4-79).

JK-278

: Uses unleaded solder.

JK-278 BOARD (SIDE A)

JK-278 BOARD (SIDE B)

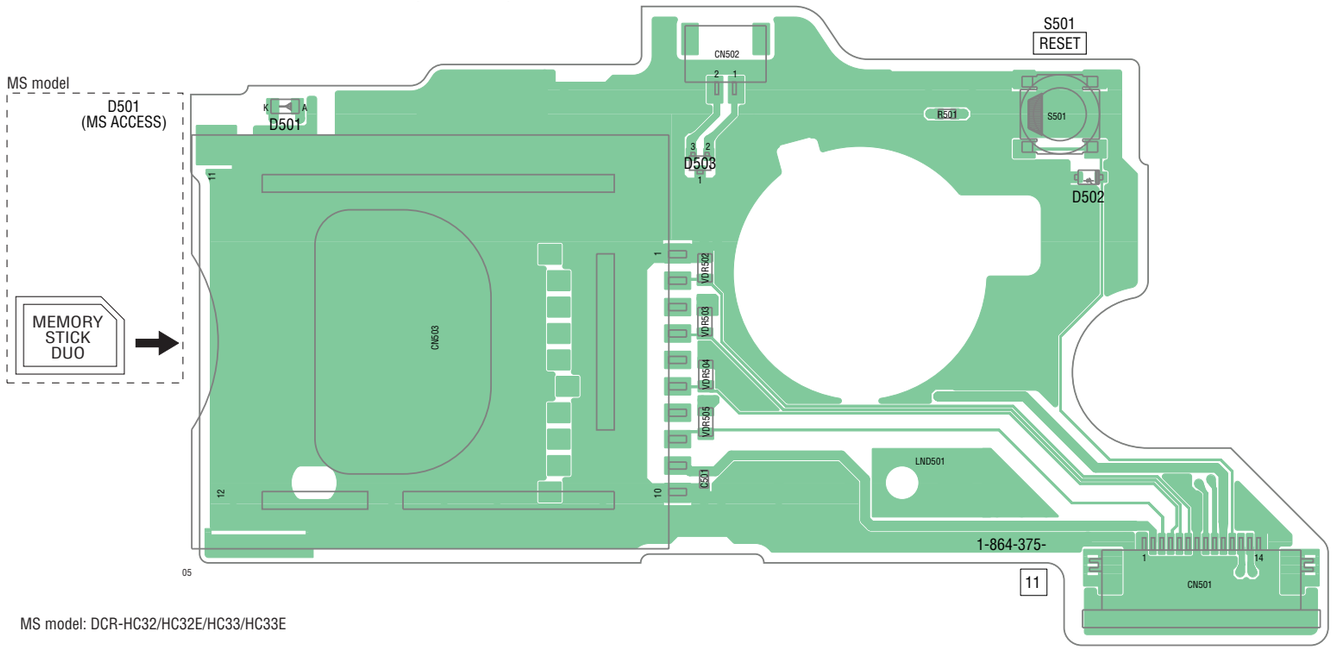


NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
NON CRADLE model: DCR-HC17E/HC19E/HC21/HC21E

MS-249

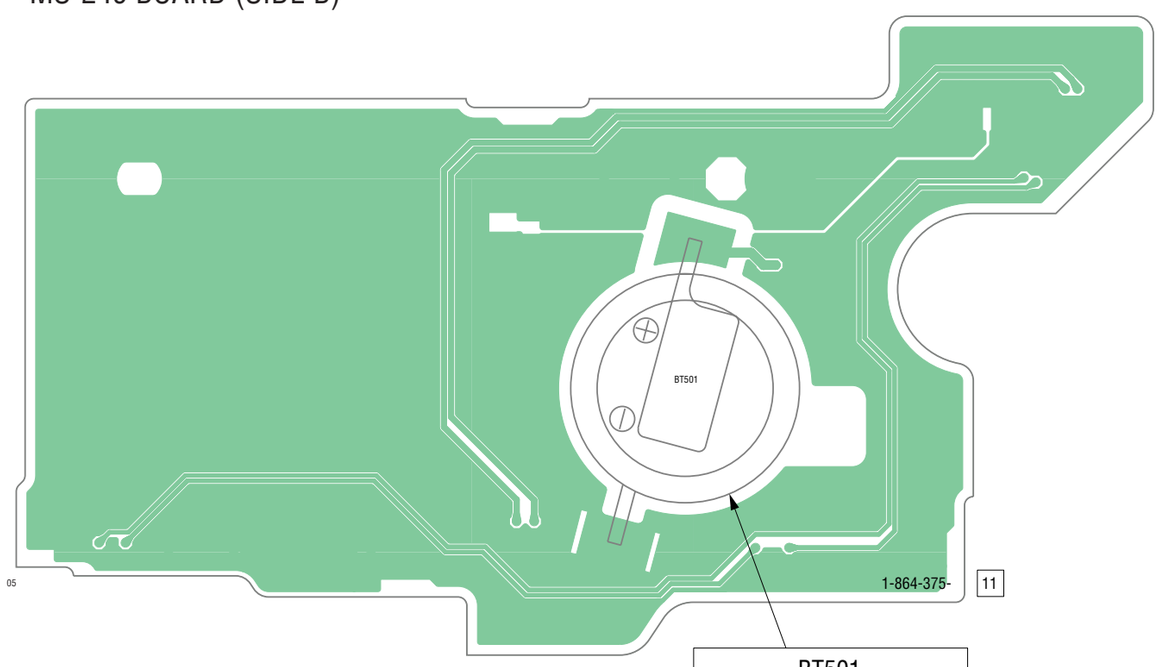
: Uses unleaded solder.

MS-249 BOARD (SIDE A)



MS model: DCR-HC32/HC32E/HC33/HC33E

MS-249 BOARD (SIDE B)



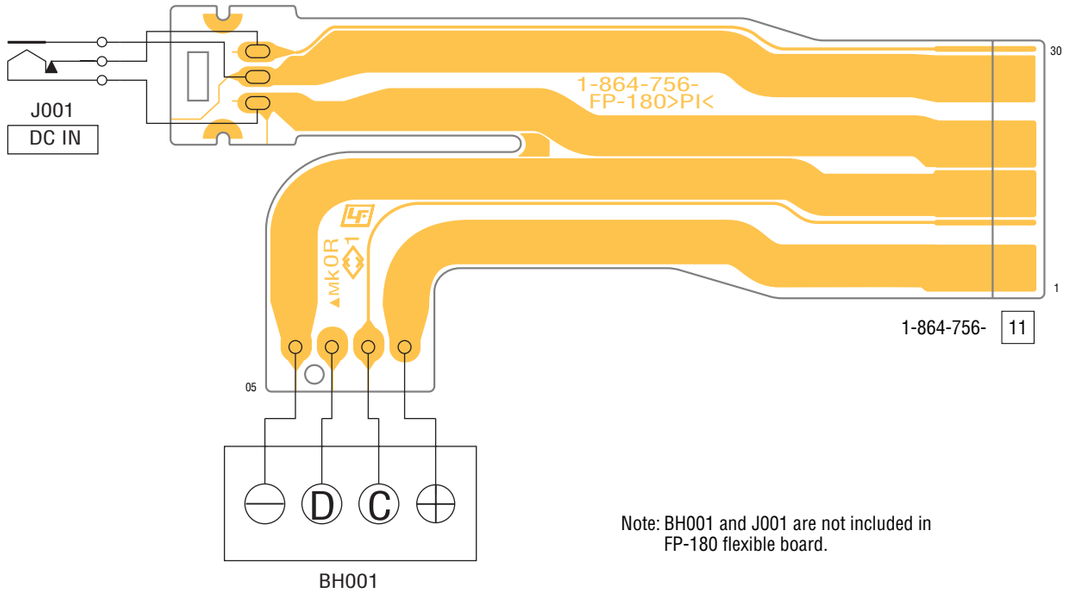
CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

BT501
BATTERY,
LITHIUM SECONDARY

FP-180

: Uses unleaded solder.

FP-180 FLEXIBLE BOARD

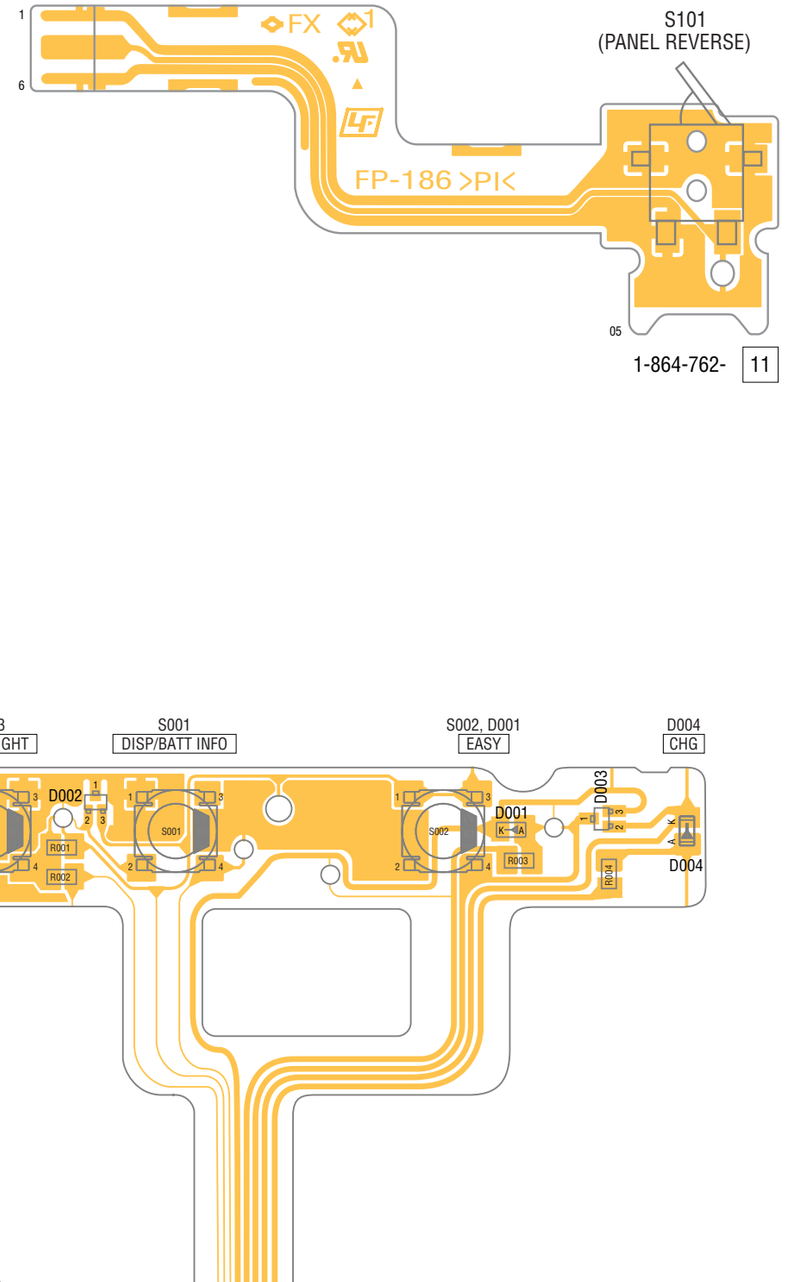


Note: BH001 and J001 are not included in FP-180 flexible board.

FP-186

: Uses unleaded solder.

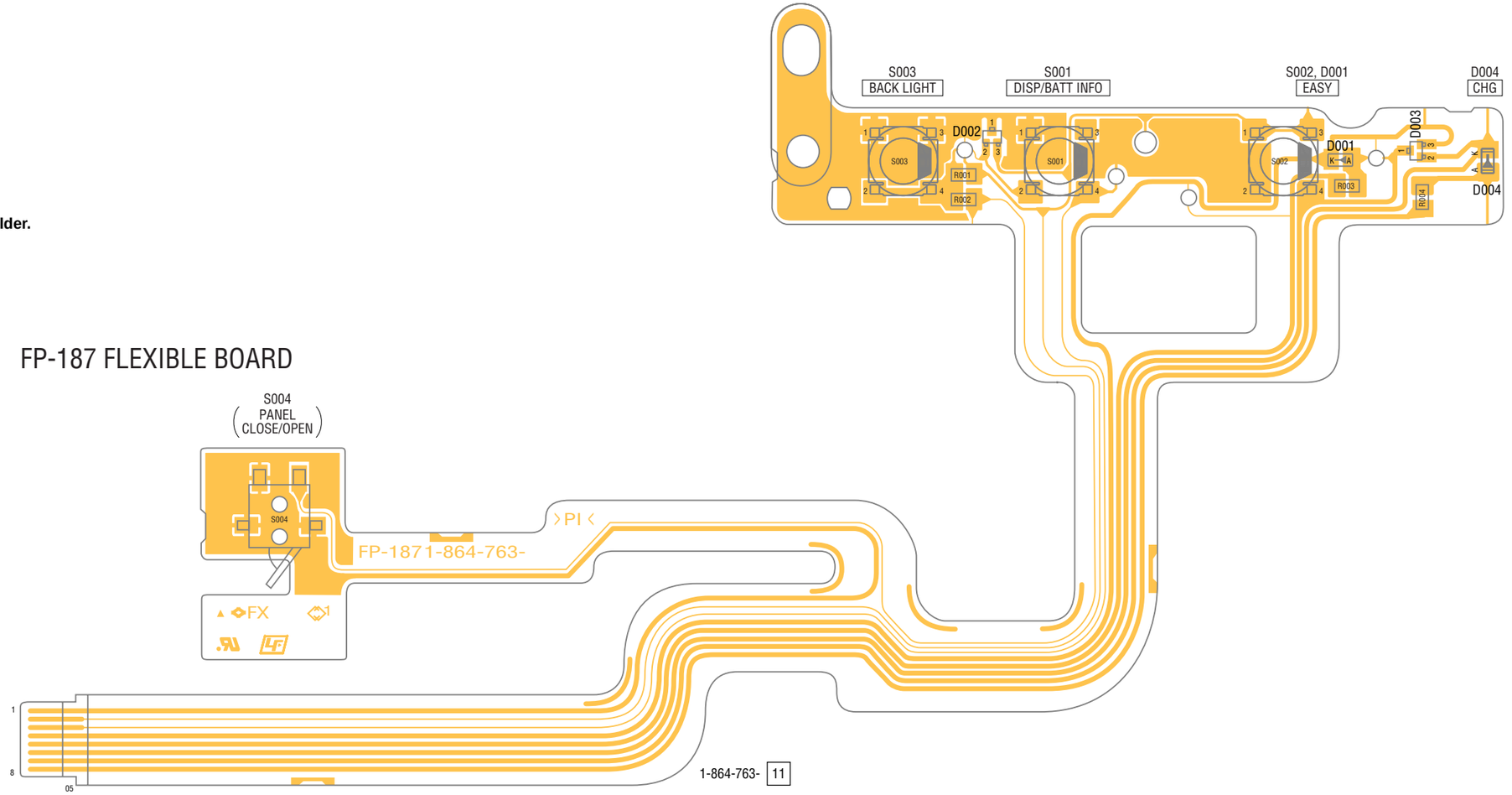
FP-186 FLEXIBLE BOARD



FP-187

: Uses unleaded solder.

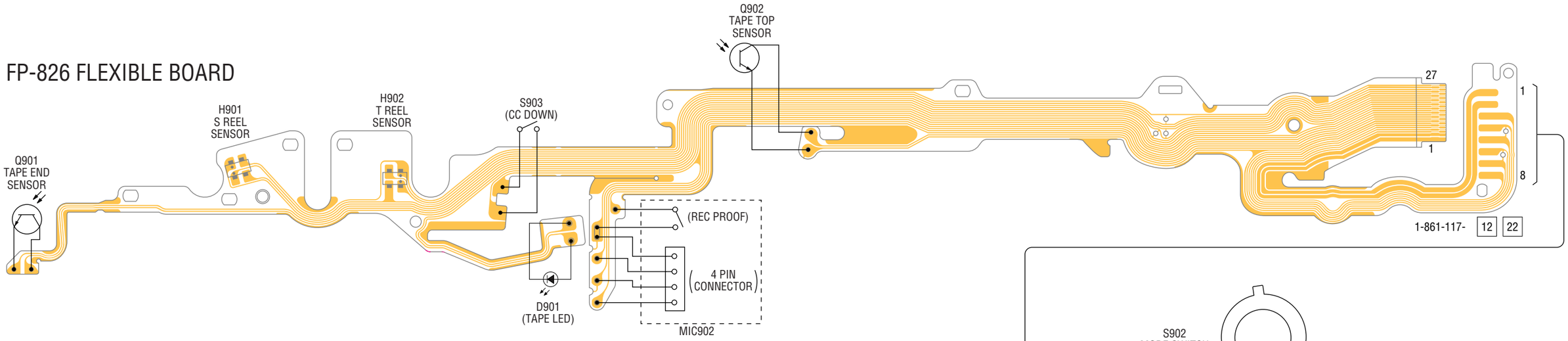
FP-187 FLEXIBLE BOARD

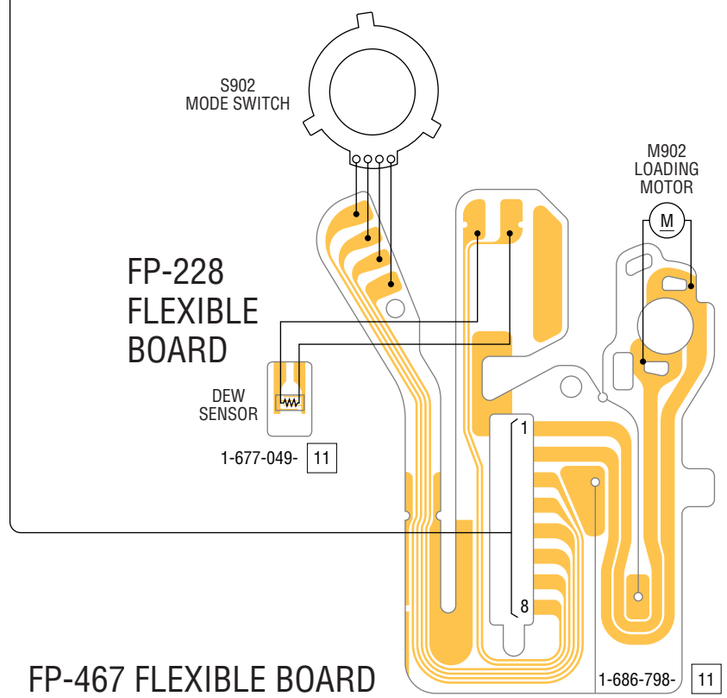


Note for Printed Wiring Board (See page 4-79).

: Uses unleaded solder.

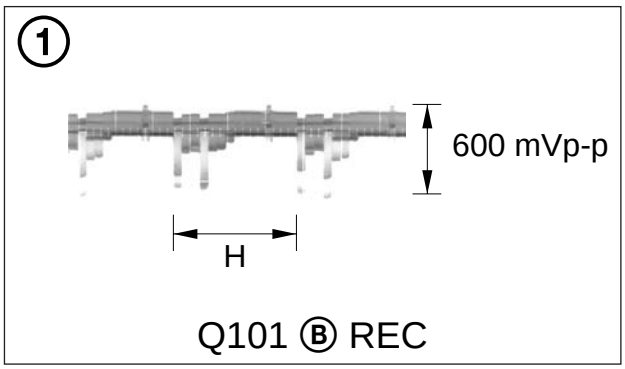
FP-826 FLEXIBLE BOARD





4-4. WAVEFORMS

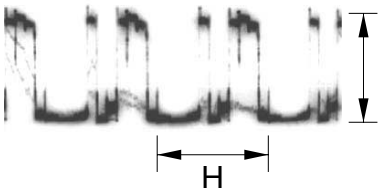
CD-533 BOARD



Waveforms of the VC-376/377 board are not shown.
Pages 4-102 to 4-111 are not shown.

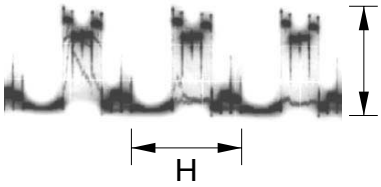
PD-237 BOARD

①



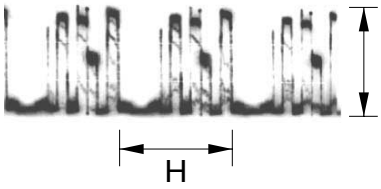
IC602 ㉞ REC/PB

②



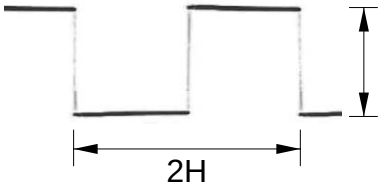
IC602 ㉝ REC/PB

③



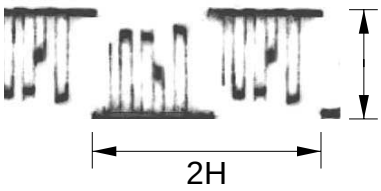
IC602 ㉜ REC/PB

④



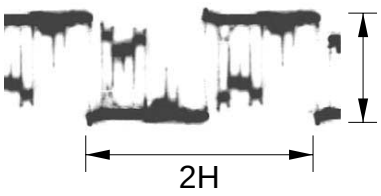
IC602 ㉖ REC/PB

⑤



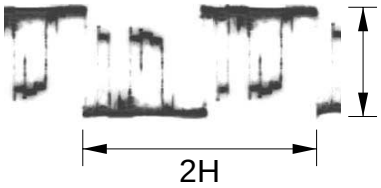
IC602 ㉒ REC/PB

⑥



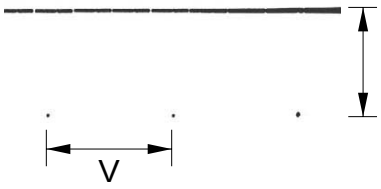
IC602 ㉑ REC/PB

⑦



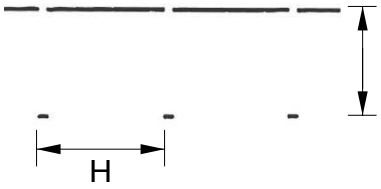
IC602 ⑳ REC/PB

⑧



IC602 ① REC/PB

⑨



IC602 ㊽ REC/PB

Mounted parts location of the VC-376/377 board are not shown.
Pages 4-113, 4-114, 4-115, 4-116 are not shown.

4-5. MOUNTED PARTS LOCATION

no mark : side A
* mark : side B

PD-237 BOARD

C602	A-1
C603	A-4
C604	A-3
C606	A-4
C608	C-3
C609	B-3
C610	B-3
C611	B-3
C612	B-3
C614	B-2
C615	B-3
C616	B-3
C618	C-3
C619	C-3
C621	C-3
C622	B-2
C623	B-2
C624	B-2
C625	B-1
C626	B-1
C627	A-1
C631	C-1
C632	A-4
C633	C-2
CN601	C-4
CN602	C-2
CN603	B-2
CN605	A-1
CN608	C-1
CN609	B-3
D602	B-1
FB601	A-4
IC601	C-3
IC602	A-2
L601	A-4
L602	C-3
L603	C-3
Q601	B-2
Q602	B-2
Q606	C-1
Q607	C-1
Q608	C-1
Q609	B-1
Q610	B-1
Q611	C-1
Q612	C-2
R605	C-1
R606	C-2
R608	C-2
R609	B-3
R610	C-3
R612	A-3
R613	B-3
R614	B-3
R615	C-2
R616	C-2
R617	C-2
R619	C-2
R620	B-2
R623	C-1
R624	C-1
R625	C-1
R626	C-3
R627	C-3
R634	B-1
R636	C-1
R637	B-1
R638	C-4
R639	C-4
R642	C-2
R643	C-2
RB601	A-2

SI-042 BOARD

C602	B-2
* C603	B-2
C608	C-2
C610	C-2
C611	C-2
C612	C-2
C613	C-2
C614	C-2
C615	C-2
C616	C-2
* C618	B-2
* C619	C-1
C621	C-1
* CN601	B-2
* CN603	C-2
D601	B-2
D602	C-2
* D604	C-2
* FB601	B-2
* FB602	B-1
* FB603	C-2
* FB604	C-1
IC601	B-2
IC602	C-2
* L601	B-2
* R601	C-2
R602	C-2
R603	C-2
R604	C-2
R605	C-2
R606	C-2
* R607	A-1
RB601	C-1
S601	A-1
* SE601	A-1
* SE602	B-1

JK-278 BOARD

* CN701	D-1
* CN702	B-1
* CN703	C-1
* CN704	B-1
* D703	A-1
* D705	D-1
* D706	D-1
* D707	D-1
* F701	C-1
* F702	C-1
* FB701	D-1
* FB702	D-1
* FB703	D-1
* J701	E-1
* LF701	B-1
* R702	A-1
* R703	A-1
* R705	C-1
* R706	C-1
* R707	C-1
* R709	C-1

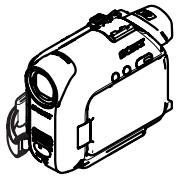
NOTE

5. REPAIR PARTS LIST

NOTE: Characters A to Z of the electrical parts list indicate location of exploded views in which the desired part is shown.

Link

EXPLODED VIEWS

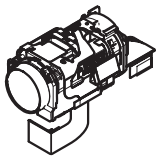


A

OVERALL ASSEMBLY

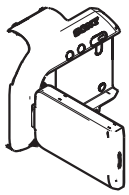
B

F PANEL BLOCK



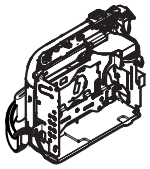
C

LENS BLOCK



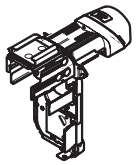
D

CABINET (R) BLOCK



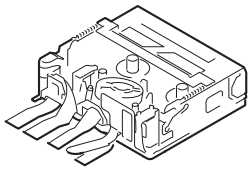
E

CS BLOCK



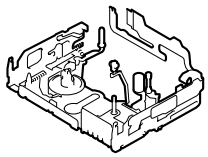
F

BAT EVF BLOCK



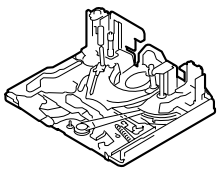
G

MECHANISM DECK



H

LS CHASSIS BLOCK ASSEMBLY



I

MECHANICAL CHASSIS BLOCK ASSEMBLY

Link

ELECTRICAL PARTS LIST

ACCESSORIES

CD-533 BOARD C	FP-187 FLEXIBLE BOARD D	LB-109 BOARD F
CR-050 BOARD D	FP-467 FLEXIBLE BOARD I	MS-249 BOARD E
FP-180 FLEXIBLE BOARD F	FP-826 FLEXIBLE BOARD H	PD-237 BOARD D
FP-186 FLEXIBLE BOARD D	JK-278 BOARD E	SI-042 BOARD B

5. REPAIR PARTS LIST

NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- CAPACITORS:
  uF: µF
- COILS
  uH: µH
- RESISTORS
  All resistors are in ohms.
  METAL: metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA...: µA... , uPA... , µPA... ,
  uPB... , µPB... , uPC... , µPC... ,
  uPD..., µPD...
- Abbreviation
  AUS : Australian model
  CH : Chinese model
  CND : Canadian model
  EE : East European model
  HK : Hong Kong model
  JE : Tourist model
  KR : Korea model
  NE : North European model

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

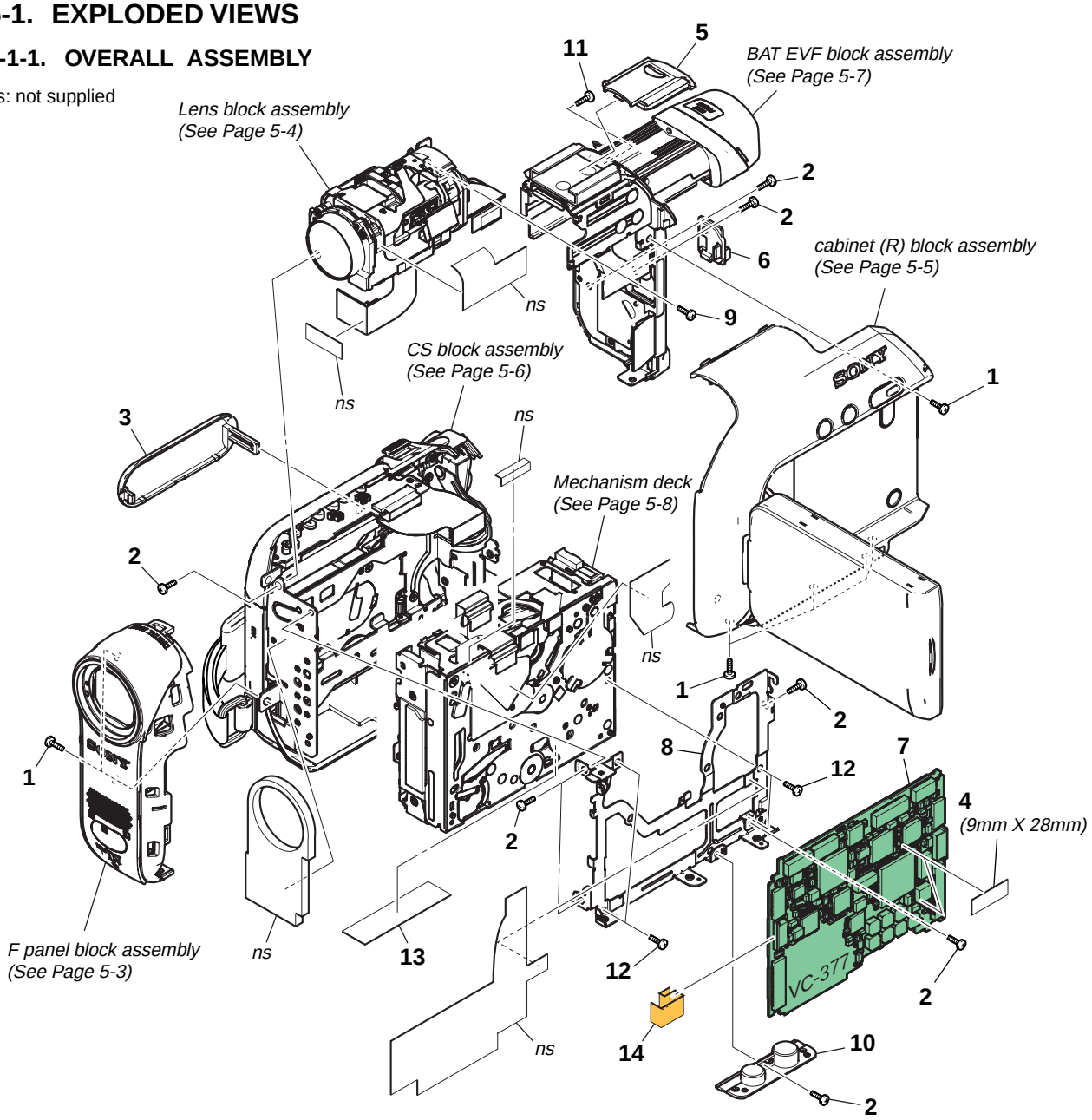
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

5. REPAIR PARTS LIST

5-1. EXPLODED VIEWS

5-1-1. OVERALL ASSEMBLY

ns: not supplied

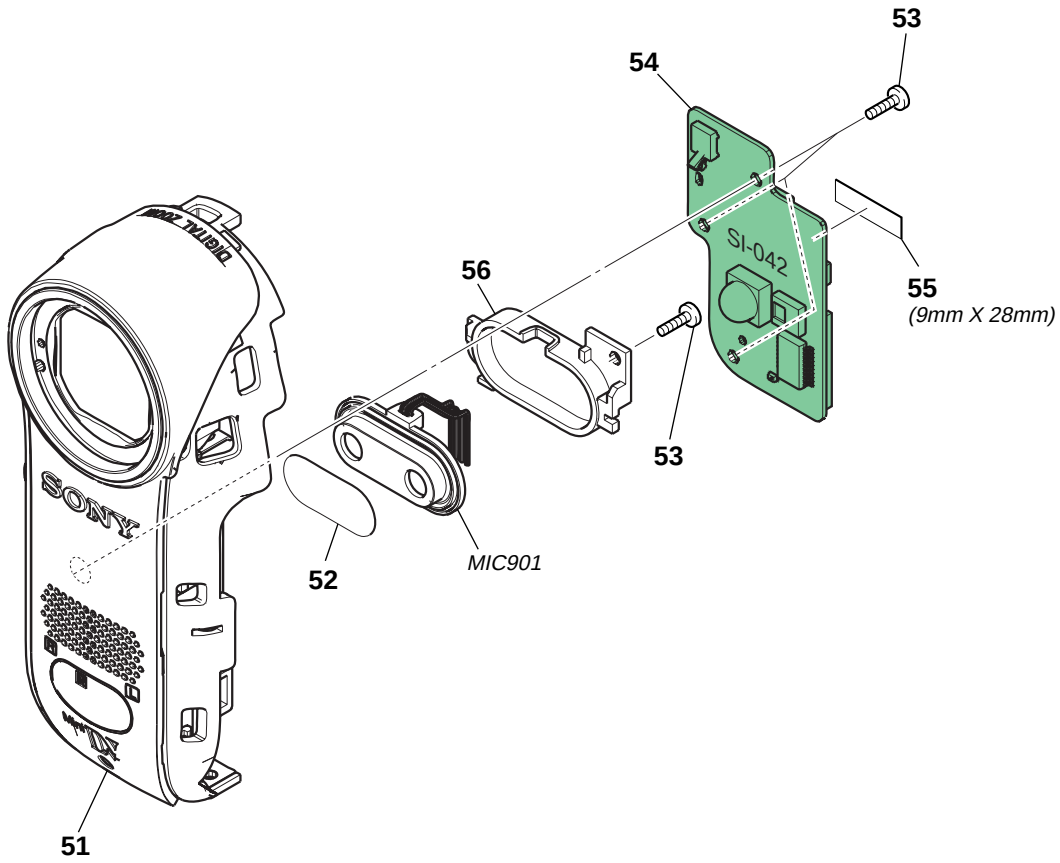


CAUTION :
For the part of 4 : TAPE (A) (3-080-272-01), cut WOVEN (T0.25), FABRIC NON (3-941-343-21) into the desired length and use it.

Ref. No.	Part No.	Description
1	3-078-889-31	SCREW (M1.7)
2	3-080-198-11	SCREW (M1.7), LOCK ACE, P2
3	2-188-477-01	COVER, JACK
4	CAUTION	TAPE (A)
5	2-188-481-01	COVER (103), SHOE
6	2-188-478-01	LID, CPC
7	A-1101-182-A	VC-376 BOARD, COMPLETE (SERVICE) (HC17E/HC19E)
7	A-1101-183-A	VC-376 BOARD, COMPLETE (SERVICE) (HC21/HC21E)
7	A-1101-184-A	VC-376 BOARD, COMPLETE (SERVICE) (HC22E)
7	A-1101-185-A	VC-377 BOARD, COMPLETE (SERVICE) (HC32: EXCEPT KR/HC33)
7	A-1101-190-A	VC-377 BOARD, COMPLETE (SERVICE) (HC32E/HC33E)
7	A-1113-387-A	VC-377 BOARD, COMPLETE (SERVICE) (HC32: KR)
8	X-2023-772-1	FRAME ASSY, MD
9	3-080-204-21	SCREW, TAPPING, P2
10	3-089-520-01	SCREW
11	3-080-198-31	SCREW (M1.7), LOCK ACE, P2
12	3-062-214-01	SCREW (M1.4X1.5)
13	3-081-221-01	LABEL (Z), LS
14	1-829-774-11	CABLE, FLEXIBLE FLAT (FFC-038)

5-1-2. F PANEL BLOCK

ns: not supplied



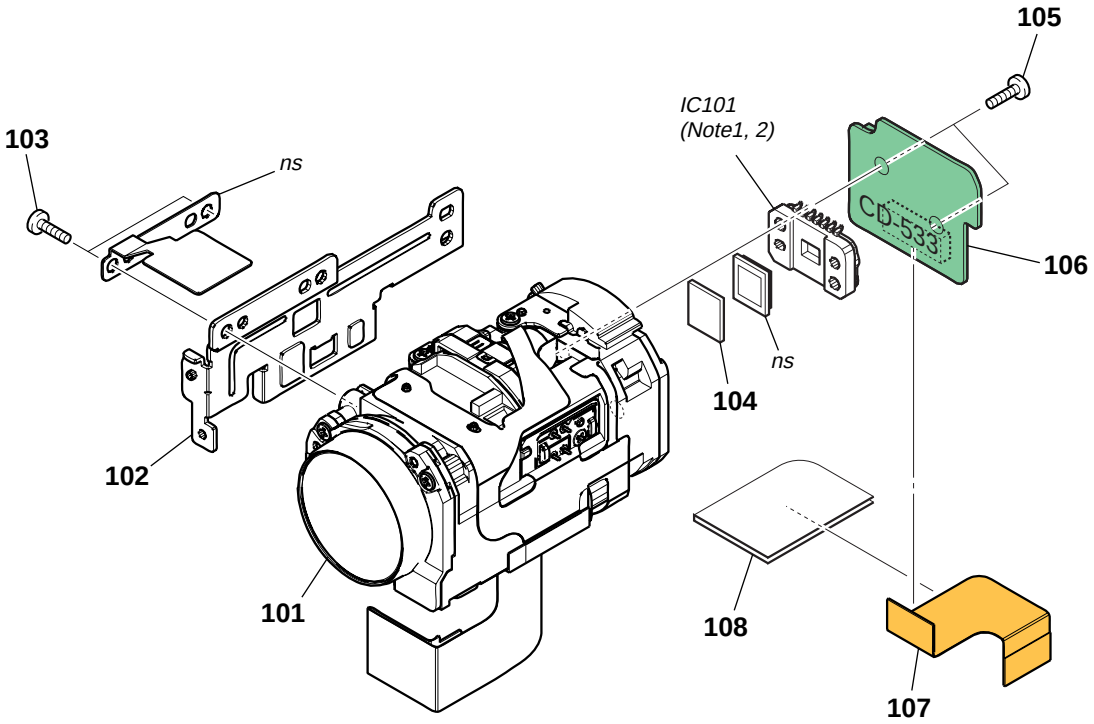
CAUTION :
For the part of 55 : TAPE (A) (3-080-272-01), cut WOVEN (T0.25), FABRIC NON (3-941-343-21) into the desired length and use it.

Ref. No.	Part No.	Description
51	X-2023-770-1	PANEL ASSY, FRONT (EXCEPT HC17E)
51	X-2048-777-1	PANEL ASSY, FRONT (HC17E)
52	3-089-771-01	CUSHION, MICROPHONE
53	3-078-890-11	SCREW, TAPPING
54	A-1081-844-A	SI-042 BOARD, COMPLETE (EXCEPT HC17E)

Ref. No.	Part No.	Description
54	A-1084-828-A	SI-042 BOARD, COMPLETEED) (HC17E)
55	CAUTION	TAPE (A)
56	2-188-425-01	RETAINER, IR
MIC901	1-542-513-21	MICROPHONE

5-1-3. LENS BLOCK

ns: not supplied



Note 1:	IC101 is not included in CD-533 complete board.

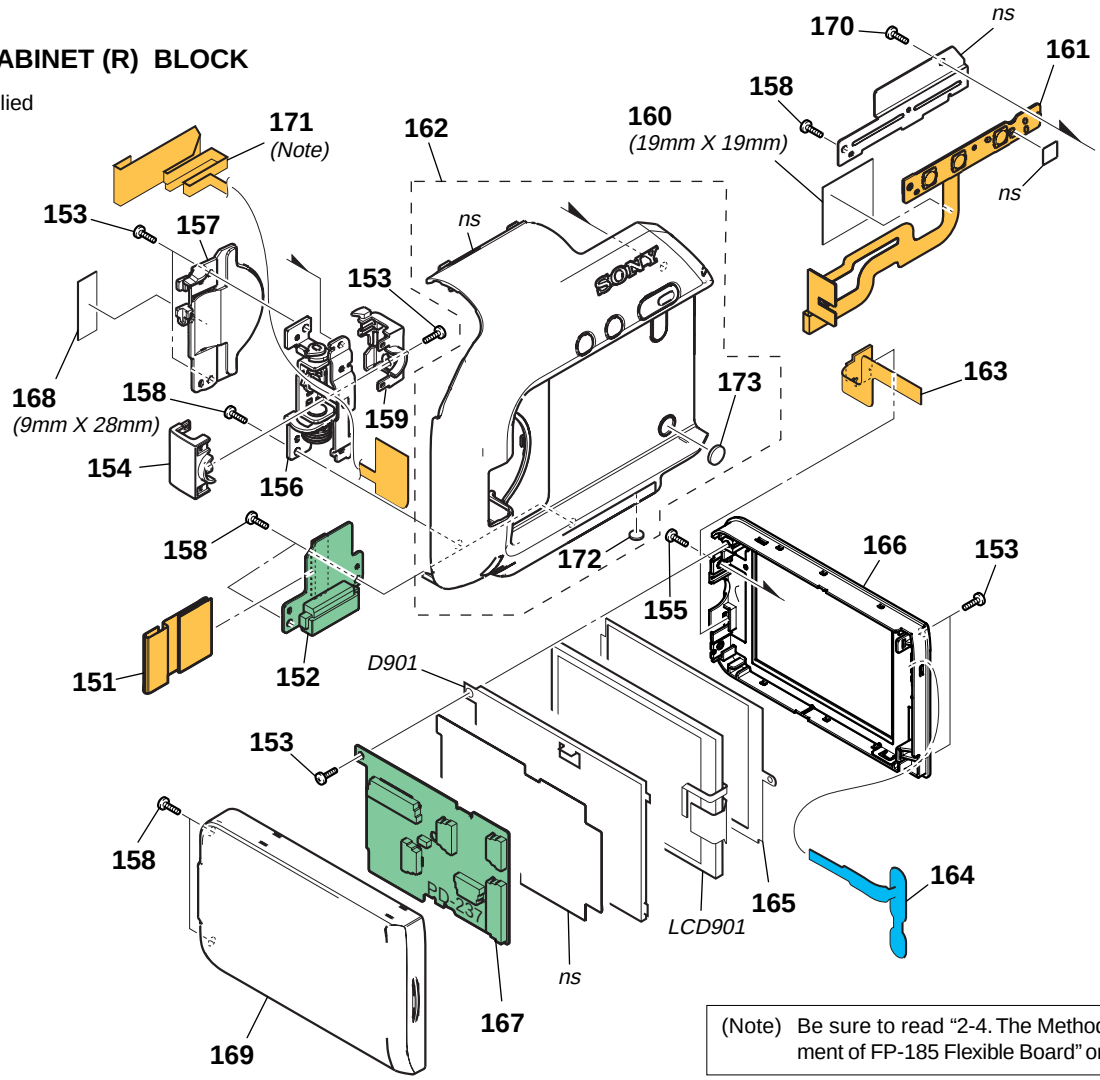
Note 2:	Be sure to read “Precuations for Replacement of CCD Imager” on page 4-5 when changing the CCD imager.

Ref. No.	Part No.	Description
101	1-788-210-11	OPTICAL UNIT (EG03)
102	2-188-472-01	FRAME LENS
103	3-080-204-01	SCREW, TAPPING, P2
104	1-788-242-11	OPTICAL FILTER BLOCK
105	3-080-204-21	SCREW, TAPPING, P2
106	A-1081-698-A	CD-533 BOARD, COMPLETE

Ref. No.	Part No.	Description
107	1-864-754-11	FP-178 FLEXIBLE BOARD
108	2-188-482-01	SHEET, CD SHIELD
IC101	8-753-215-47	ICX440NKF-13 (CCD IMAGER) (HC21/HC32/HC33) (Note1, 2)
IC101	8-753-215-49	ICX441NKF-13 (CCD IMAGER) (EXCEPT HC21/HC32/HC33) (Note1, 2)

5-1-4. CABINET (R) BLOCK

ns: not supplied



(Note) Be sure to read "2-4. The Method of Attachment of FP-185 Flexible Board" on page 2-8.

CAUTION 1 :
For the part of 160 : TAPE (BT) (2-349-851-01), cut WOVEN (T0.25), FABRIC NON (3-076-631-01) into the desired length and use it.

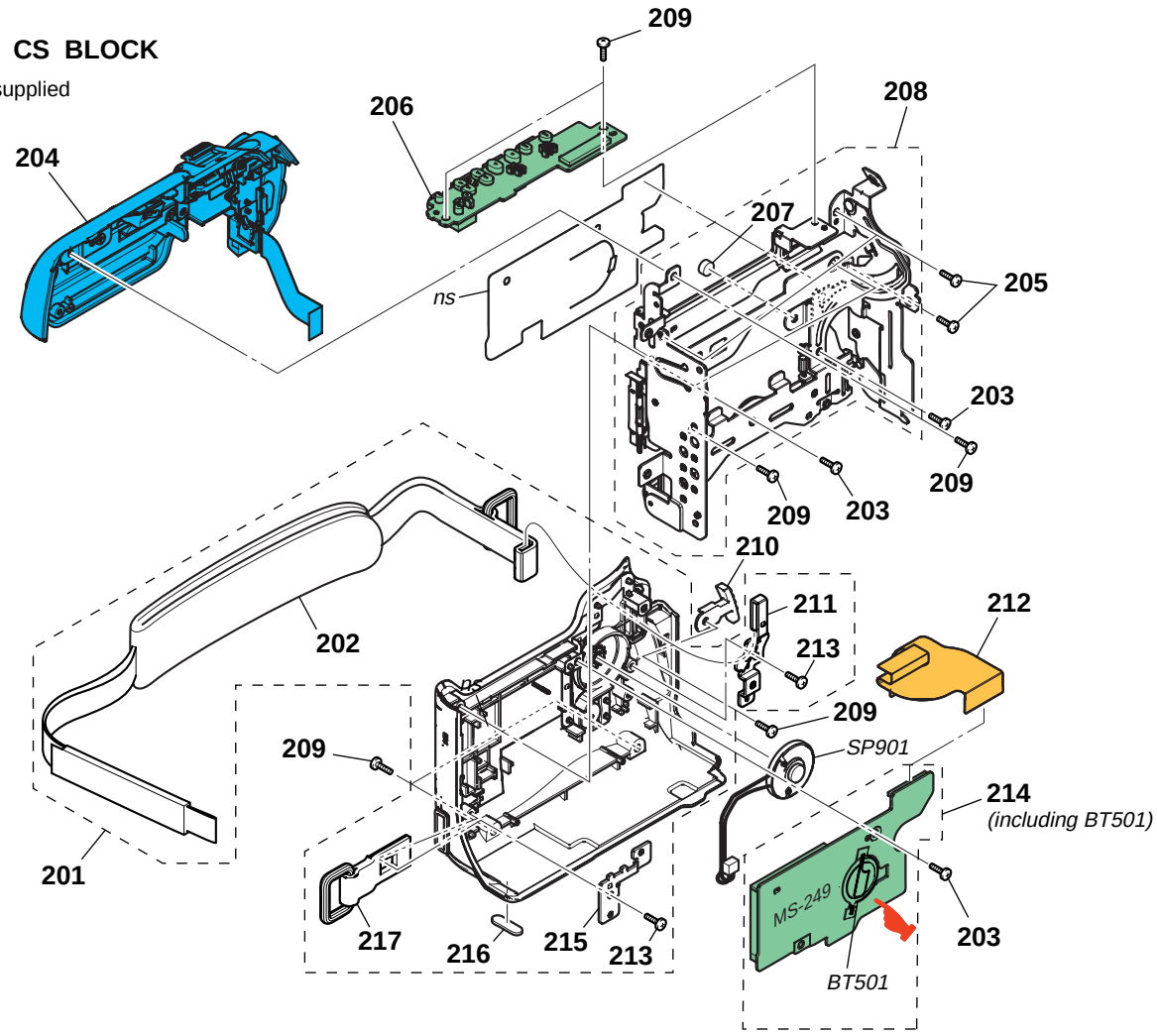
CAUTION 2 :
For the part of 168 : TAPE (A) (3-080-272-01), cut WOVEN (T0.25), FABRIC NON (3-941-343-21) into the desired length and use it.

Ref. No.	Part No.	Description
151	1-864-764-11	FP-190 FLEXIBLE BOARD (HC22E/HC32/HC32E/HC33/HC33E)
152	A-1081-704-A	CR-050 BOARD, COMPLETE (HC22E/HC32/HC32E/HC33/HC33E)
153	3-080-204-21	SCREW, TAPPING, P2
154	2-188-434-01	COVER (C), HINGE
155	3-078-889-21	SCREW (M1.7)
156	X-2023-771-1	HINGE (103) ASSY
157	2-188-476-01	BLIND, HINGE
158	3-078-890-11	SCREW, TAPPING
159	2-188-433-01	COVER (M), HINGE
160	CAUTION 1	TAPE (BT)
161	A-1082-203-A	FP-187 FLEXIBLE BOARD
162	X-2023-839-1	CABINET R ASSY (HC17E/HC19E/HC21/HC21E)
162	X-2024-694-1	CABINET R ASSY (HC22E/HC32/HC32E/HC33/HC33E)
163	A-1082-042-A	FP-186 FLEXIBLE BOARD
164	1-479-063-21	KEY BLOCK, CONTROL (SB9000)
165	2-188-436-01	CUSHION (103), PANEL
166	X-2024-273-1	CABINET (M) (103) ASSY, P

Ref. No.	Part No.	Description
167	A-1081-848-A	PD-237 BOARD, COMPLETE
168	CAUTION 2	TAPE (A)
169	2-188-432-01	CABINET (C)103, P (HC21)
169	2-188-432-11	CABINET (C)103, P (HC17E)
169	2-188-432-21	CABINET (C)103, P (HC19E)
169	2-188-432-31	CABINET (C)103, P (HC21E)
169	2-188-432-41	CABINET (C)103, P (HC32)
169	2-188-432-51	CABINET (C)103, P (HC32E)
169	2-188-432-61	CABINET (C)103, P (HC33)
169	2-188-432-71	CABINET (C)103, P (HC33E)
169	2-188-432-81	CABINET (C)103, P (HC22E)
170	3-085-397-01	SCREW
171	1-864-761-11	FP-185 FLEXIBLE BOARD
172	3-082-519-01	FOOT (R), RUBBER
173	3-089-565-01	CUSHION (R), PANEL
D901	1-479-067-11	BLOCK, LIGHT GUIDE PLATE (2.5)
LCD901	A-1090-678-A	(TP) BLOCK ASSY (2.5AUMG) (HC32)
LCD901	A-1090-679-A	(TP) BLOCK ASSY (2.5STFU) (HC17E/HC19E/HC21E/HC22E)
LCD901	A-1090-680-A	(TP) BLOCK ASSY (2.5STMG) (HC21/HC32/HC32E/HC33/HC33E)

5-1-5. CS BLOCK

ns: not supplied



BT501(BATTERY, LITHIUM SECONDARY)
Board on the mount position (See page 4-96).

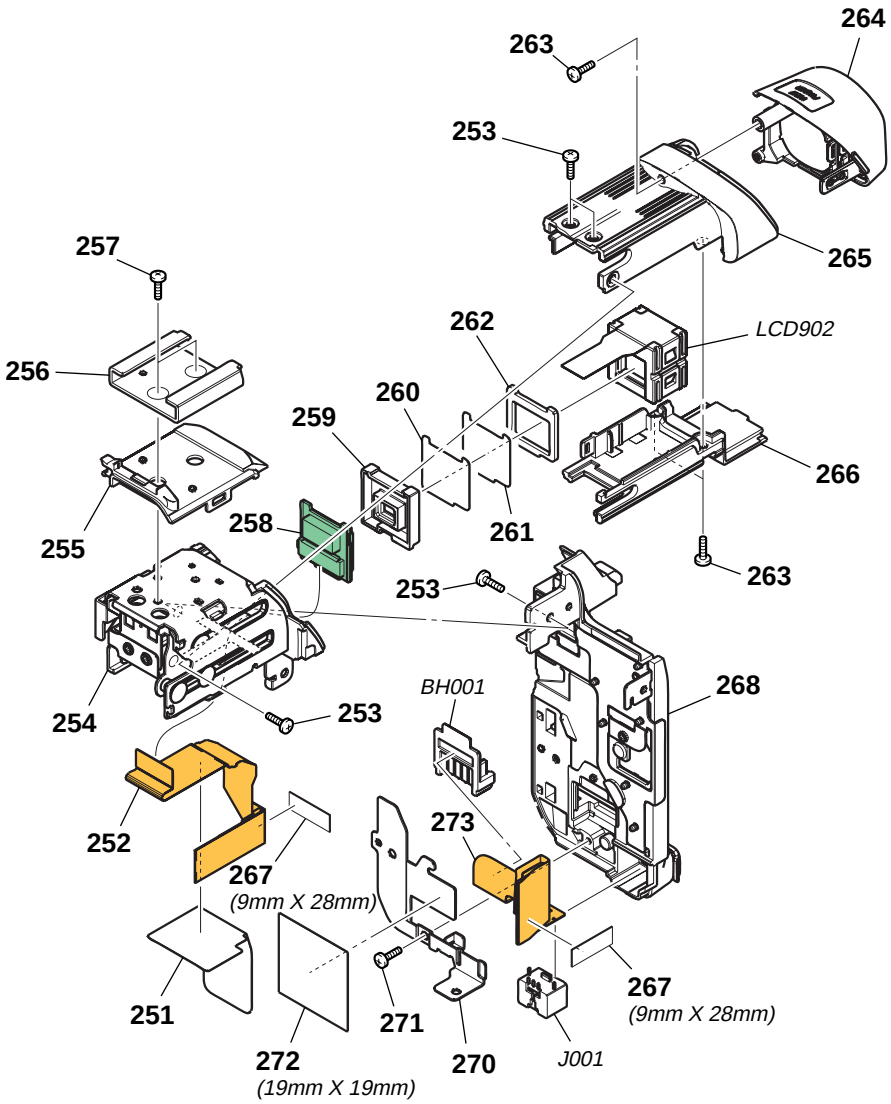
CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description
201	X-2023-774-1	CABINET (G) ASSY (HC17E/HC19E/HC21/HC21E/HC22E)
201	X-2024-840-1	CABINET (G) ASSY (HC32/HC32E/HC33/HC33E)
202	2-583-631-01	BELT, GRIP
203	3-078-890-11	SCREW, TAPPING
204	1-478-982-11	KEY BLOCK, CONTROL (SS10300) (HC17E/HC19E)
204	1-478-982-21	KEY BLOCK, CONTROL (SS10300) (HC21/HC21E)
204	1-478-982-31	KEY BLOCK, CONTROL (SS10300) (HC22E)
204	1-478-982-41	KEY BLOCK, CONTROL (SS10300) (HC32/HC32E/HC33/HC33E)
205	3-080-204-01	SCREW, TAPPING, P2
206	A-1081-840-A	JK-278 BOARD, COMPLETE (HC17E/HC19E/HC21/HC21E)
206	A-1081-841-A	JK-278 BOARD, COMPLETE (HC22E/HC32/HC32E/HC33/HC33E)
207	3-959-978-02	CUSHION, PANEL
208	X-2023-773-1	FRAME ASSY, CS
209	3-080-198-11	SCREW (M1.7), LOCK ACE, P2
210	2-188-450-01	KNOB, EJECT
211	2-188-455-01	SHEET METAL (REAR), GRIP BELT
212	1-864-758-11	FP-182 FLEXIBLE BOARD
213	3-080-204-11	SCREW, TAPPING, P2
214	A-1081-842-A	MS-249 BOARD, COMPLETE (HC17E/HC19E/HC21/HC21E/HC22E)
214	A-1081-843-A	MS-249 BOARD, COMPLETE (HC32/HC32E/HC33/HC33E)
215	2-188-453-01	SHEET METAL (FRONT), GRIP BELT
216	2-188-514-01	FOOT (G), RUBBER
217	2-583-616-01	BELT (FRONT), GRIP
⚠BT501	1-756-075-21	BATTERY, LITHIUM (SECONDARY)
SP901	1-825-260-23	LOUD SPEAKER (1.6cm)

5-1-6. BAT EVF BLOCK

ns: not supplied



CAUTION 1 :
For the part of 267 : TAPE (A) (3-080-272-01), cut WOVEN (T0.25), FABRIC NON (3-941-343-21) into the desired length and use it.

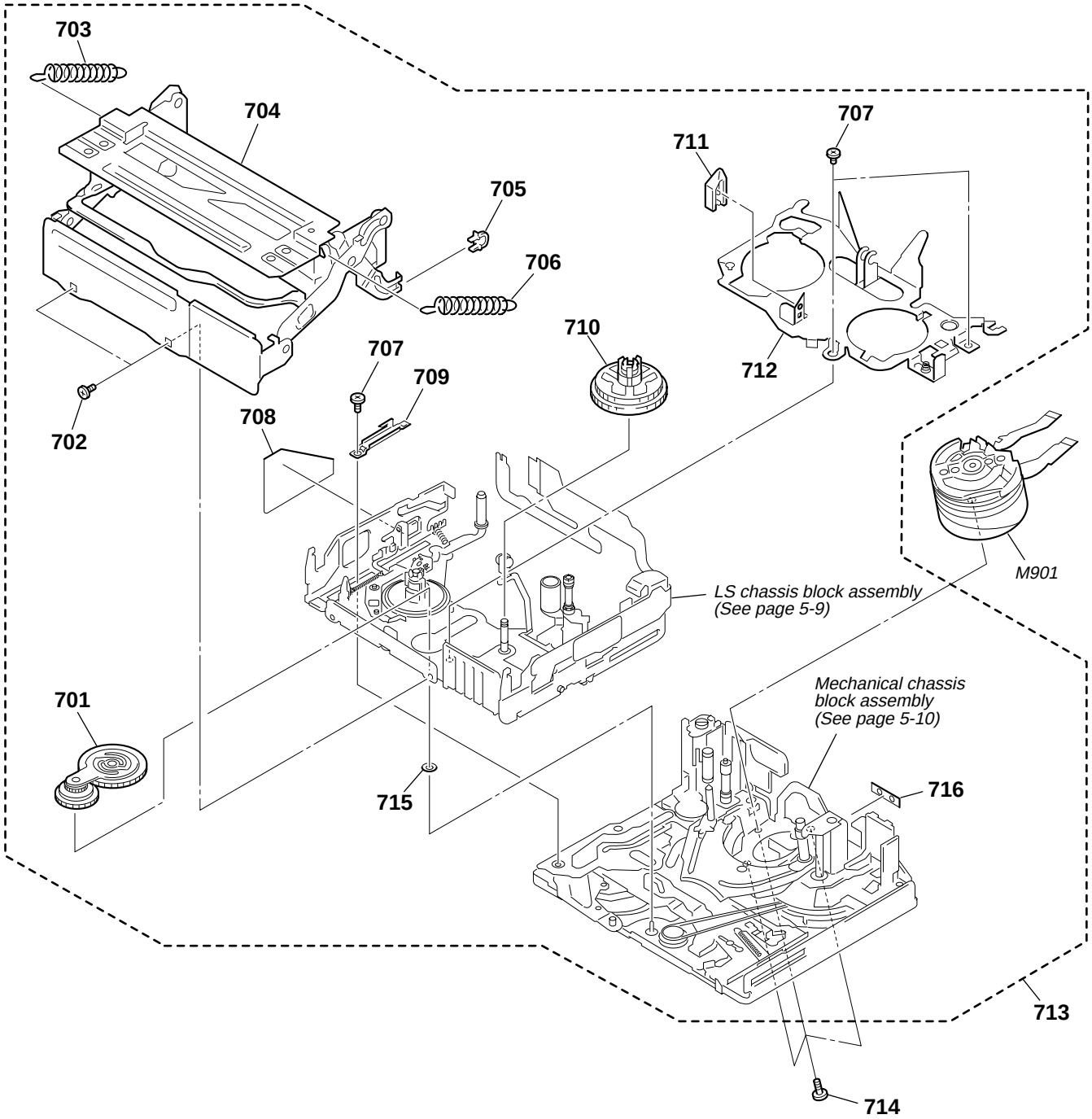
CAUTION 2 :
For the part of 272 : TAPE (BT) (2-349-851-01), cut WOVEN (T0.25), FABRIC NON (3-076-631-01) into the desired length and use it.

Ref. No.	Part No.	Description
251	2-188-512-01	SHEET, VF FLEXIBLE FIXED
252	1-864-757-11	FP-181 FLEXIBLE BOARD
253	3-078-889-21	SCREW (M1.7)
254	X-2023-650-1	VF SLIDE ASSY
255	3-067-469-11	SHOE, ACCESSORY
256	2-188-479-01	BASE (103), SHOE
257	2-188-485-01	0 PLATE BIS M1.7
258	A-1081-845-A	LB-109 BOARD, COMPLETE
259	3-089-415-01	GUIDE, LAMP
260	3-089-417-01	ILLUMINATOR
261	3-089-416-01	SHEET, PRISM
262	3-089-419-01	CUSHION, LCD
263	3-080-204-21	SCREW, TAPPING, P2

Ref. No.	Part No.	Description
264	X-2023-648-1	EYE CUP ASSY
265	X-2023-647-1	CABINET UPPER ASSY VF
266	2-188-511-01	CABINET LOWER, VF
267	CAUTION 1	TAPE (A)
268	X-2048-504-1	BT PANEL ASSY
270	2-188-500-01	PLATE, BT TERMINAL RETAINER
271	3-080-204-01	SCREW, TAPPING, P2
272	CAUTION 2	TAPE (BT)
273	1-864-756-11	FP-180 FLEXIBLE BOARD
BH001	1-780-064-21	BATTERY TERMINAL BOARD
J001	1-815-792-11	CONNECTOR, DC-IN (7.2V)
LCD902	8-753-208-84	LCX059ALA-1 (EXCEPT HC33E)
LCD902	8-753-234-60	LCX059ZLA-1 (HC33E)

5-1-7. MECHANISM DECK

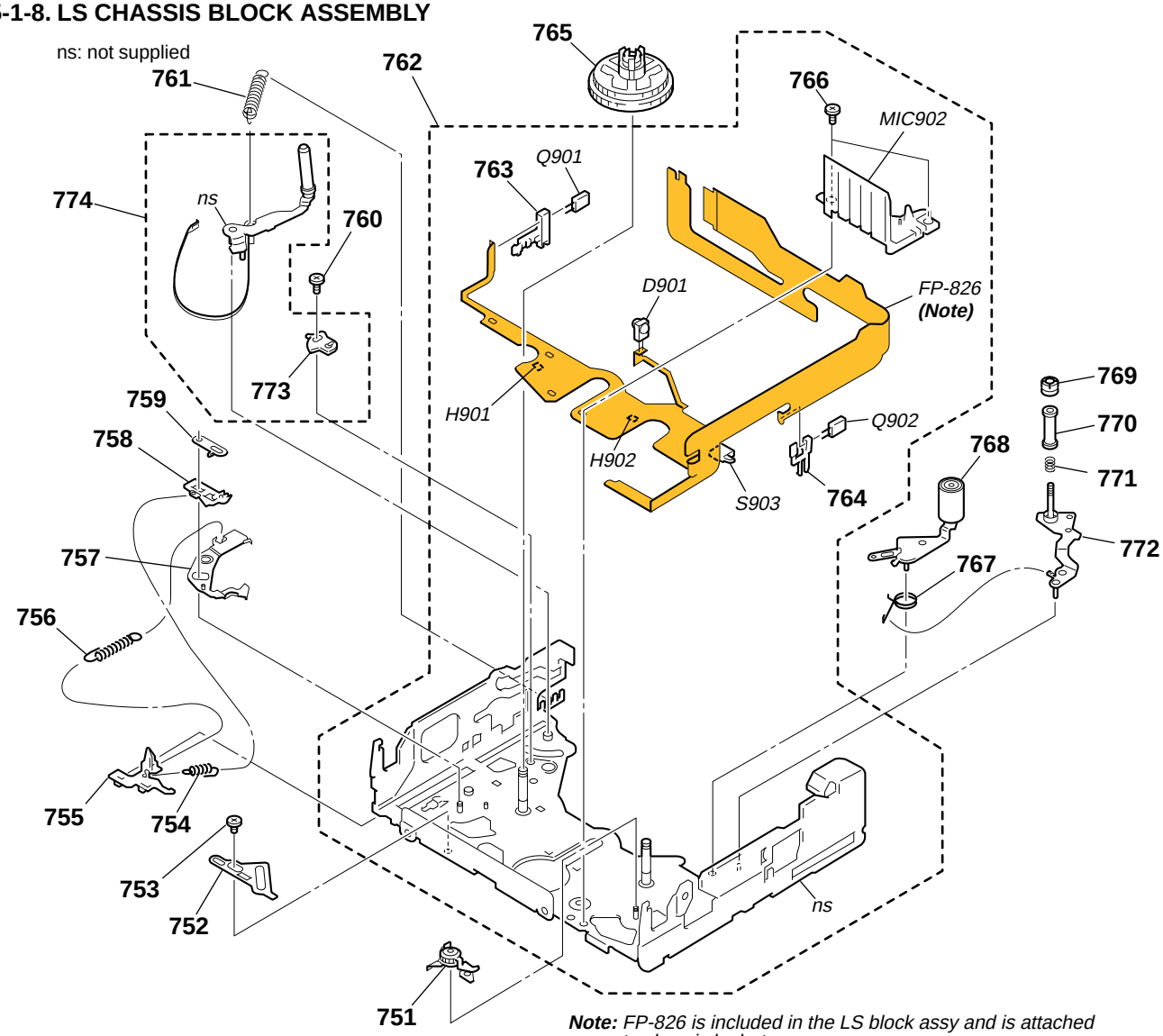
ns: not supplied



Ref. No.	Part No.	Description
701	X-3952-938-6	GEAR ASSY, GOOSENECK
702	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
703	3-079-206-02	SPRING (POP UP S), TXTENSION
704	X-2024-802-1	COMPARTMENT ASSY, CASSETTE
705	3-079-367-01	DAMPER, CASSETTE COMPARTMENT
706	3-079-215-02	SPRING (POP UP T), EXTENSION
707	3-085-330-01	SCREW, SPECIAL
708	3-080-545-01	COVER, SENSOR S
709	3-079-364-01	RETAINER, LS GUIDE

Ref. No.	Part No.	Description
710	X-3952-937-1	TABLE ASSY, T REEL
711	3-079-366-01	RELEASE, REEL LOCK
712	X-3953-257-1	PLATE ASSY, RETAINER
713	A-1082-424-A	MD (Z210) SUB ASSY
714	3-079-741-02	SCREW, DRUM FIXING
715	3-748-682-01	WASHER, T
716	3-087-881-01	SHEET, ADHESIVE, FLEXIBLE
M901	A-7048-994-A	DRUM (DEH-30B-R) (SERVICE)

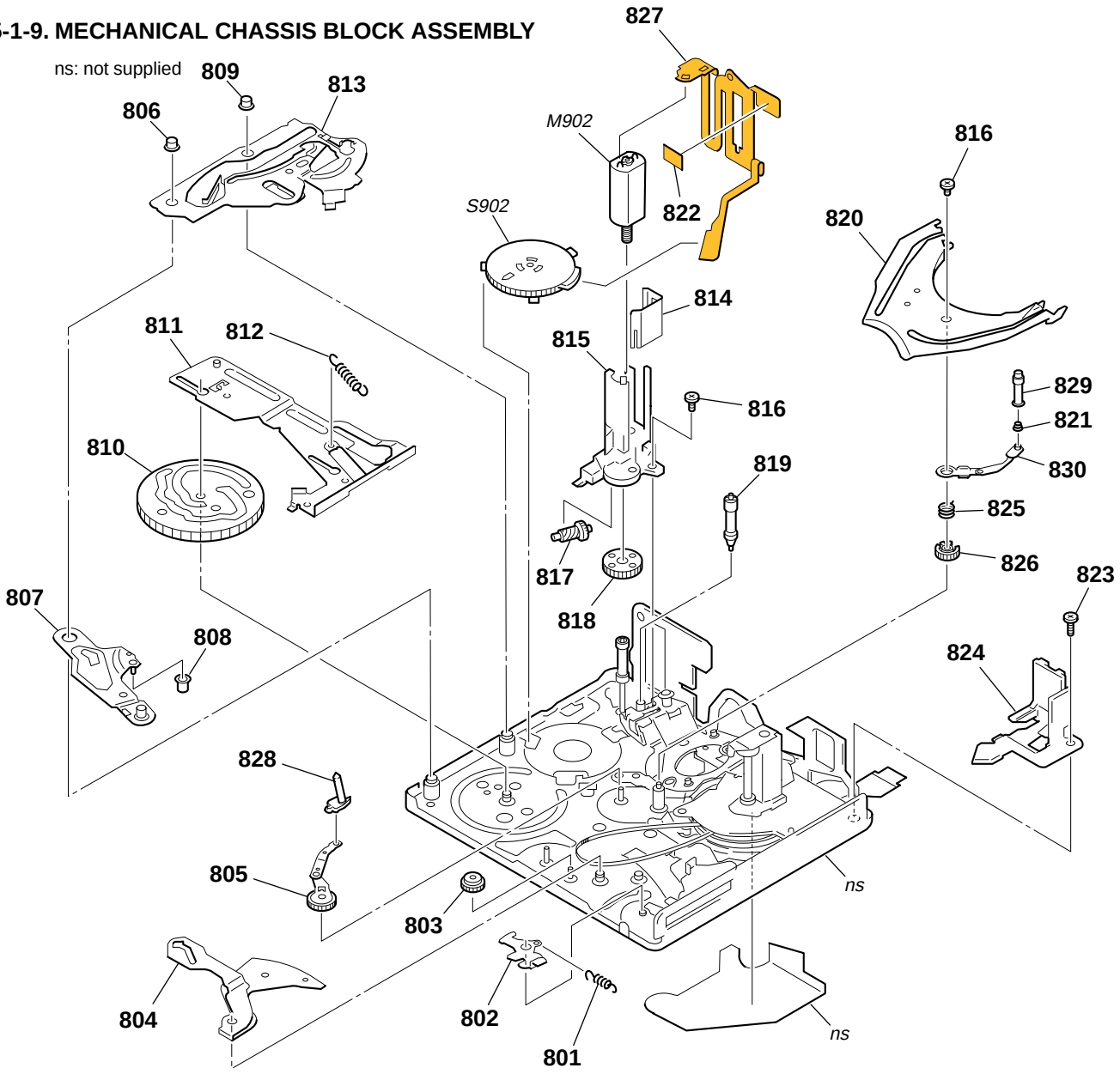
5-1-8. LS CHASSIS BLOCK ASSEMBLY



Note: *FP-826 is included in the LS block assy and is attached to chassis by hot-press.*
Because installation of FP-826 requires a very high accuracy, FP-826 is not supplied as an independent service parts.

Ref. No.	Part No.	Description
751	A-7095-402-B	BRAKE (T) BLOCK ASSY (S)
752	3-079-241-01	PLATE, LS CAM
753	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
754	3-079-246-01	SPRING (RELEASE RACK), EXTENSION
755	3-079-248-01	POSITIONING (S), CASSETTE
756	3-079-244-01	SPRING (ULE), EXTENSION
757	X-3952-932-1	BRAKE ASSY, ULE
758	3-079-245-01	RACK (S), RELEASE
759	3-079-247-01	BRAKE (S)
760	3-059-090-11	SCREW (M1.4X2.5), SPECIAL HEAD
761	3-079-242-01	SPRING, TENSION
762	A-7095-951-A	LS BLOCK ASSY
763	3-079-267-01	HOLDER (S), SENSOR
764	3-079-268-01	HOLDER (T), SENSOR
765	X-3952-936-2	TABLE ASSY, S REEL
766	3-085-330-01	SCREW, SPECIAL
767	3-079-243-02	SPRING (PINCH RETURN), TORSION
768	X-3952-934-1	ARM ASSY, PINCH
769	3-052-062-02	NUT, TG7
770	3-079-219-02	TG7
771	3-081-591-01	SPRING, COMPRESSION (TG7)
772	X-3952-935-3	ARM ASSY, TG7
773	3-079-237-01	ADJUSTOR, BAND
774	A-7095-403-B	TG2 ARM BLOCK ASSY
D901	6-500-652-01	DIODE GL453SE0000F (TAPE LED)
H901	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (S REEL)
H902	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (T REEL)
MIC902	1-817-175-12	PIN, CONNECTOR (WITH DETECTION SWITCH)
Q901	6-550-672-01	TRANSISTOR PT4850FJE00F (TAPE END)
Q902	6-550-672-01	TRANSISTOR PT4850FJE00F (TAPE TOP)
S903	1-529-566-51	SWITCH, PUSH (1 KEY) (C.C. DOWN)

5-1-9. MECHANICAL CHASSIS BLOCK ASSEMBLY



Ref. No.	Part No.	Description
801	3-079-314-01	SPRING (EJ), EXTENSION
802	3-079-327-01	ARM, EJ
803	3-079-323-01	GEAR, CONVERSION
804	3-079-324-01	ARM, GL DRIVING
805	X-3952-928-1	GL (S) ASSY
806	3-079-315-01	ROLLER (S1), LS GUIDE
807	X-3952-925-1	ARM ASSY, LS
808	3-079-320-01	ROLLER, LS
809	3-079-316-01	ROLLER (S2), LS GUIDE
810	3-079-319-01	GEAR, CAM
811	X-3954-274-2	SLIDER ASSY (N), M
812	3-079-321-02	SPRING (PINCH), EXTENSION
813	X-3954-273-2	PLATE ASSY (N), TG2 CAM
814	3-079-312-01	SHIELD, MOTOR
815	3-079-307-02	HOLDER, MOTOR
816	3-085-330-01	SCREW, SPECIAL
817	3-079-308-01	SHAFT, WORM
818	3-079-309-01	GEAR, DECELERATION
819	X-3952-942-2	ROLLER ASSY, TG3
820	3-079-325-01	RAIL, GUIDE
821	3-079-295-02	SPRING, TG5
822	1-677-049-11	FP-228 FLEXIBLE BOARD (DEW SENSOR)
823	3-079-328-01	SCREW (M1.4), SPECIAL HEAD
824	3-079-326-02	SUPPORT, TG7
825	3-079-301-01	SPRING (GLT), TORSION
826	3-079-298-01	GEAR (T), GL
827	1-686-798-11	FP-467 FLEXIBLE BOARD
828	X-3952-927-2	COASTER (S) ASSY
829	X-3952-930-3	ROLLER ASSY, TG5
830	X-3952-929-1	COASTER (T) ASSY
M902	A-7095-396-A	MOTOR BLOCK ASSY, L (LOARDING)
S902	1-477-679-11	ROTARY, ENCODER (SWITCH) (MODE SWITCH)

5-2. ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	A-1081-698-A	CD-533 BOARD, COMPLETE
		**********
		(IC101 is not included in this complete board)
		< CAPACITOR >
C101	1-104-851-11	TANTAL. CHIP 10uF 20% 10V
C102	1-164-850-11	CERAMIC CHIP 10PF 0.5PF 50V
C104	1-127-820-11	CERAMIC CHIP 4.7uF 10% 16V
		< CONNECTOR >
CN101	1-691-354-21	CONNECTOR, FFC/FPC (ZIF) 16P
		< COIL >
L101	1-469-528-91	INDUCTOR 100uH
		< IC >
IC101	8-753-215-47	ICX440NKF-13 (CCD IMAGER) (HC21/HC32/HC33) (Note)
IC101	8-753-215-49	ICX441NKF-13 (CCD IMAGER) (EXCEPT HC21/HC32/HC33) (Note)
		< TRANSISTOR >
Q101	8-729-423-55	TRANSISTOR 2SC3931-D
		< RESISTOR >
R101	1-218-959-11	RES-CHIP 3.3K 5% 1/16W
	A-1081-704-A	CR-050 BOARD, COMPLETE (HC22E/HC32/HC32E/HC33/HC33E)
		**********
		< CONNECTOR >
CN001	1-817-283-41	CONNECTOR, FPC (ZIF) 51P
CN002	(Not supplied)	CONNECTOR, MULTIPLE (SOCKET)
		< DIODE >
D001	6-500-044-01	DIODE DF6A6.8FU (TE85R)
D002	6-500-044-01	DIODE DF6A6.8FU (TE85R)
D003	6-500-044-01	DIODE DF6A6.8FU (TE85R)
D005	6-500-044-01	DIODE DF6A6.8FU (TE85R)
D006	6-500-776-01	DIODE MAZW068H0LS0
D007	8-719-083-91	DIODE EDZ TE61 6.8B
	1-864-756-11	FP-180 FLEXIBLE BOARD
		**********
		(BH001 and J001 are not included in this flexible board)
		< BATTERY TERMINAL >
BH001	1-780-064-21	BATTERY TERMINAL BOARD
		< JACK >
J001	1-815-792-11	CONNECTOR, DC-IN (7.2V) (DC IN)

Ref. No.	Part No.	Description
	A-1082-042-A	FP-186 FLEXIBLE BOARD, COMPLETE
		**********
		< SWITCH >
S101	1-786-179-31	SWITCH, PUSH (1KEY) (PANEL REVERSE)
	A-1082-203-A	FP-187 FLEXIBLE BOARD, COMPLETE
		**********
		< DIODE >
D001	6-501-052-01	DIODE CL-197HB1-D-T (EASY)
D002	6-500-776-01	DIODE MAZW068H0LS0
D003	6-500-776-01	DIODE MAZW068H0LS0
D004	8-719-060-92	DIODE SML-311YTT86 (CHG)
		< RESISTOR >
R001	1-216-822-11	METAL CHIP 1.2K 5% 1/10W
R002	1-216-823-11	METAL CHIP 1.5K 5% 1/10W
R003	1-216-817-11	METAL CHIP 470 5% 1/10W
R004	1-216-805-11	METAL CHIP 47 5% 1/10W
		< SWITCH >
S001	1-771-138-82	SWITCH, KEY BOARD (DSPL/BATT INFO)
S002	1-771-138-82	SWITCH, KEY BOARD (EASY)
S003	1-771-138-82	SWITCH, KEY BOARD (BACK LIGHT)
S004	1-786-180-31	SWITCH, PUSH (1KEY) (PANEL OPEN/CLOSE)
	1-686-798-11	FP-467 FLEXIBLE BOARD
		**********
		(S902 is not included in this flexible board)
		< SWITCH >
S902	1-477-679-11	ROTARY, ENCODER (SWITCH) (MODE SWITCH)
	(Not supplied)	FP-826 FLEXIBLE BOARD
		**********
		(This flexible board is included in LS BLOCK ASSY (A-7095-951-A))
		< DIODE >
D901	6-500-652-01	DIODE GL453SE0000F (TAPE LED)
		< HOLL ELEMENT >
H901	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (S REEL)
H902	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (T REEL)
		< CONNECTOR >
MIC902	1-817-175-12	PIN, CONNECTOR (WITH DELCTION SWITCH)
		< TRANSISTOR >
Q901	6-550-672-01	TRANSISTOR PT4850FJE00F (TAPE END)
Q902	6-550-672-01	TRANSISTOR PT4850FJE00F (TAPE TOP)

Note: Be sure to read “Precautions for Replacement of CCD Imager” on page 4-5 when changing the CCD imager.

Ref. No.	Part No.	Description
		< SWITCH >
S903	1-529-566-51	SWITCH, PUSH (1 KEY) (C.C. DOWN)
	A-1081-840-A	JK-278 BOARD, COMPLETE (HC17E/HC19E/HC21/HC21E)
	A-1081-841-A	JK-278 BOARD, COMPLETE (HC22E/HC32/HC32E/HC33/HC33E)
		**********
		< CONNECTOR >
CN701	1-815-794-21	CONNECTOR (MULTIPLE) (A/V OUT: HC17E/HC19E/HC21/HC21E/HC22E) (A/V: HC32/HC32E/HC33/HC33E)
CN702	1-794-962-11	CONNECTOR, SQUARE TYPE (USB 5P) (USB) (HC17E/HC19E/HC21/HC21E)
CN703	1-794-276-11	CONNECTOR, SQUARE TYPE 4P (DV OUT: HC17E/HC19E) (DV IN/OUT: HC21/HC21E)
CN704	1-818-087-31	CONNECTOR, FFC/FPC (LIF) 26P
		< DIODE >
D703	8-719-078-02	DIODE 1SS357 (T3SONY1) (HC17E/HC19E/HC21/HC21E)
D705	6-500-044-01	DIODE DF6A6.8FU (TE85R)
D706	6-500-044-01	DIODE DF6A6.8FU (TE85R)
D707	6-500-044-01	DIODE DF6A6.8FU (TE85R)
		< FUSE >
⚠F701	1-576-647-11	FUSE (0.2A/50V) (HC17E/HC19E/HC21/HC21E)
⚠F702	1-576-647-11	FUSE (0.2A/50V) (HC17E/HC19E/HC21/HC21E)
		< FERRITE BEAD >
FB701	1-400-823-11	EMI FERRITE (SMD)(1005)
FB702	1-400-823-11	EMI FERRITE (SMD)(1005)
FB703	1-400-823-11	EMI FERRITE (SMD)(1005)
		< JACK >
J701	1-793-995-11	JACK, SUPER SMALL TYPE (LANC)
		< LINE FILTER >
LF701	1-456-583-11	COMMON MODE CHOKE COIL (HC17E/HC19E/HC21/HC21E)
		< RESISTOR >
R702	1-218-965-11	RES-CHIP 10K 5% 1/16W (HC17E/HC19E/HC21/HC21E)
R703	1-218-965-11	RES-CHIP 10K 5% 1/16W (HC17E/HC19E/HC21/HC21E)
R705	1-218-990-11	SHORT CHIP 0
R706	1-218-990-11	SHORT CHIP 0
R707	1-218-990-11	SHORT CHIP 0
R709	1-218-990-11	SHORT CHIP 0

Ref. No.	Part No.	Description
	A-1081-845-A	LB-109 BOARD, COMPLETE
		**********
		< CAPACITOR >
C301	1-125-777-11	CERAMIC CHIP 0.1uF 10% 10V
C302	1-165-908-11	CERAMIC CHIP 1uF 10% 10V
C303	1-164-505-11	CERAMIC CHIP 2.2uF 16V
		< CONNECTOR >
CN301	1-818-046-11	CONNECTOR, FFC/FPC 20P
CN302	1-784-420-11	CONNECTOR, FFC/FPC (ZIF) 21P
		< DIODE >
D302	6-500-941-01	DIODE MAZS056008S0
D303	6-500-874-01	DIODE E1S35-AW0C7-01-A2 (BACKLIGHT)
		< RESISTOR >
R302	1-216-841-11	METAL CHIP 47K 5% 1/10W
R303	1-218-971-11	RES-CHIP 33K 5% 1/16W
R304	1-218-975-11	RES-CHIP 68K 5% 1/16W
R305	1-218-989-11	RES-CHIP 1M 5% 1/16W
	A-1081-842-A	MS-249 BOARD, COMPLETE (HC17E/HC19E/HC21/HC21E/HC22E)
	A-1081-843-A	MS-249 BOARD, COMPLETE (HC32/HC32E/HC33/HC33E)
		**********
		< BATTERY >
⚠BT501	1-756-075-21	BATTERY, LITHIUM (SECONDARY)
		< CONNECTOR >
* CN501	1-691-378-21	CONNECTOR, FFC/FPC 14P
CN502	1-778-506-21	PIN, CONNECTOR (PC BOARD) 2P
CN503	1-817-913-41	MEMORY STICK DUO CONNECTOR (HC32/HC32E/HC33/HC33E)
		< DIODE >
D501	6-500-817-01	DIODE SML-512UWT86 (MS ACCESS) (HC32/HC32E/HC33/HC33E)
D503	6-500-776-01	DIODE MAZW068H0LS0
		< RESISTOR >
R501	1-218-949-11	RES-CHIP 470 5% 1/16W (HC32/HC32E/HC33/HC33E)
		< SWITCH >
S501	1-771-138-82	SWITCH, KEY BOARD (RESET)
	A-1081-848-A	PD-237 BOARD, COMPLETE
		**********
C602	1-164-939-11	CERAMIC CHIP 0.0022uF 10% 50V
C603	1-137-710-11	CERAMIC CHIP 10uF 20% 6.3V

CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			
C604	1-104-847-11	TANTAL. CHIP	22uF	20%	4V
C606	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C608	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C609	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C610	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C611	1-165-897-11	TANTAL. CHIP	22uF	20%	10V
C612	1-164-739-11	CERAMIC CHIP	560PF	5%	50V
C614	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C615	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C616	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C618	1-125-889-91	CERAMIC CHIP	2.2uF	10%	10V
C619	1-125-889-91	CERAMIC CHIP	2.2uF	10%	10V
C621	1-135-957-91	TANTAL. CHIP	10uF	20%	16V
C622	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C623	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C624	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C625	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C626	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C627	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C631	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C632	1-117-919-11	TANTAL. CHIP	10uF	20%	6.3V
C633	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
		< CONNECTOR >			
CN601	1-815-031-11	FFC/CONNECTOR, FPC (ZIF) 24P			
CN602	1-816-176-11	FFC/CONNECTOR, FPC (ZIF) 6P			
CN603	1-691-370-11	CONNECTOR, FFC/FPC 6P			
CN605	1-815-031-11	FFC/CONNECTOR, FPC (ZIF) 24P			
CN608	1-816-176-11	CONNECTOR, FFC/FPC (ZIF) 6P			
CN609	1-816-176-11	CONNECTOR, FFC/FPC (ZIF) 6P			
		< DIODE >			
D602	8-719-074-67	DIODE EDZ-TE61-5.6B			
		< FERRITE BEAD >			
FB601	1-400-461-21	FERRITE, EMI (SMD)(1005)			
		< IC >			
IC601	8-759-693-13	IC NJM12904V (TE2)			
IC602	8-753-229-98	IC CXM3006CR-T4			
		< COIL >			
L601	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
L602	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
L603	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
		< TRANSISTOR >			
Q601	8-729-427-52	TRANSISTOR	XP4216		
Q602	8-729-427-23	TRANSISTOR	XP4116-TXE		
Q606	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR		
Q607	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR		
Q608	6-550-234-01	TRANSISTOR	UNR32A300LS0		
Q609	8-729-041-23	TRANSISTOR	NDS356AP		
Q610	6-550-232-01	TRANSISTOR	2SA2029T2LQ/R		
Q611	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR		
Q612	8-729-053-52	TRANSISTOR	HN1C01FE-Y/GR (TPLR3)		

Ref. No.	Part No.	Description			
		< RESISTOR >			
R605	1-208-855-81	METAL CHIP	47	0.5%	1/16W
R606	1-208-943-11	METAL CHIP	220K	0.5%	1/16W
R608	1-208-927-11	METAL CHIP	47K	0.5%	1/16W
R609	1-218-975-11	RES-CHIP	68K	5%	1/16W
R610	1-218-957-11	RES-CHIP	2.2K	5%	1/16W
R612	1-218-949-11	RES-CHIP	470	5%	1/16W
R613	1-208-934-11	METAL CHIP	91K	0.5%	1/16W
R614	1-208-911-11	METAL CHIP	10K	0.5%	1/16W
R615	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R616	1-218-957-11	RES-CHIP	2.2K	5%	1/16W
R617	1-218-953-11	RES-CHIP	1K	5%	1/16W
R619	1-208-855-81	METAL CHIP	47	0.5%	1/16W
R620	1-218-965-11	RES-CHIP	10K	5%	1/16W
R623	1-208-855-81	METAL CHIP	47	0.5%	1/16W
R624	1-218-977-11	RES-CHIP	100K	5%	1/16W
R625	1-218-990-11	SHORT CHIP	0		
R626	1-218-954-11	RES-CHIP	1.2K	5%	1/16W
R627	1-218-955-11	RES-CHIP	1.5K	5%	1/16W
R634	1-218-989-11	RES-CHIP	1M	5%	1/16W
R636	1-218-990-11	SHORT CHIP	0		
R637	1-218-978-11	RES-CHIP	120K	5%	1/16W
R638	1-216-864-11	SHORT CHIP	0		
R639	1-216-864-11	SHORT CHIP	0		
R642	1-218-973-11	RES-CHIP	47K	5%	1/16W
R643	1-218-973-11	RES-CHIP	47K	5%	1/16W
		< COMPOSITION CIRCUIT BLOCK >			
RB601	1-234-369-21	RES, NETWORK	10 (1005X4)		

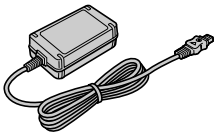
	A-1084-828-A	SI-042 BOARD, COMPLETE (HC17E)			
	A-1081-844-A	SI-042 BOARD, COMPLETE (EXCEPT HC17E)			
		**********			
		< CAPACITOR >			
C602	1-125-837-91	CERAMIC CHIP	1uF	10%	6.3V
C603	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C608	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C610	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C611	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C612	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C613	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C614	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C615	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C616	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C618	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C619	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C621	1-100-252-11	CERAMIC CHIP	0.1uF	10%	6.3V
		< CONNECTOR >			
CN601	1-778-507-21	PIN, CONNECTOR (PC BOARD) 4P			
CN603	1-766-348-21	CONNECTOR, FFC/FPC 18P			
		< DIODE >			
D601	6-500-512-01	DIODE CL-330IRS-X-TU			
		(IR EMITTER/NIGHTSHOT)			

SI-042

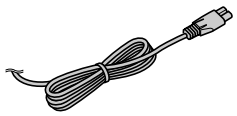
Ref. No.	Part No.	Description			
D602	6-500-817-01	DIODE SML-512UWT86 (CAMERA RECORDING)			
D604	8-719-988-61	DIODE 1SS355TE-17			
		< FERRITE BEAD >			
FB601	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB602	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB603	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB604	1-469-179-21	INDUCTOR, FERRITE BEAD			
		< IC >			
IC601	6-600-163-01	IC RS-770 (EXCEPT HC17E)			
IC602	8-759-489-19	IC uPC6756GR-8JG-E2			
		< COIL >			
L601	1-400-588-11	INDUCTOR, LAMINATE CHIP 10uH			
		< RESISTOR >			
R601	1-218-949-11	RES-CHIP	470	5%	1/16W
R602	1-218-989-11	RES-CHIP	1M	5%	1/16W
R603	1-218-965-11	RES-CHIP	10K	5%	1/16W
R604	1-218-937-11	RES-CHIP	47	5%	1/16W
R605	1-218-965-11	RES-CHIP	10K	5%	1/16W
R606	1-218-989-11	RES-CHIP	1M	5%	1/16W
R607	1-216-821-11	METAL CHIP	1K	5%	1/10W
		< COMPOSITION CIRCUIT BLOCK >			
RB601	1-234-379-21	RES, NETWORK 22K (1005X4)			
		< SWITCH >			
S601	1-786-148-11	SWITCH, PUSH (1 KEY) (LENS COVER OPEN)			
		< SENSOR >			
SE601	1-476-807-41	SENSOR, ANGULAR VELOCITY (PITCH SENSOR)			
SE602	1-476-807-31	SENSOR, ANGULAR VELOCITY (YAW SENSOR)			

Electrical parts list of the VC-376/377 board is not shown.
Pages 5-15 to 5-28 are not shown.

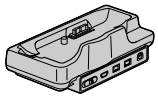
Checking supplied accessories.



AC-L AC Adaptor (1)
⚠ 1-477-534-11

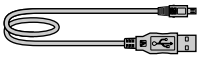


Power Cord (1)
⚠ 1-769-608-31 (AEP, E)
⚠ 1-776-985-11 (KR)
⚠ 1-782-476-51 (CH)
⚠ 1-783-374-12 (UK, HK)
⚠ 1-790-107-41 (US, CND)
⚠ 1-790-732-71 (JE)
⚠ 1-827-945-11 (AUS)

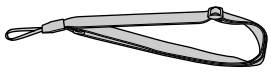


Handycam station (1)
DCRA-C121
1-818-729-11
(HC32/HC32E/HC33E)
DCRA-C122
1-818-729-21 (HC22E)

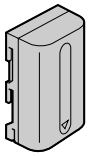
Shoe cover (1)
2-188-481-01



USB cable (1)
1-829-868-31
(EXCEPT HC17E)



Shoulder strap (1)
2-176-235-01
(EXCEPT HC17E)



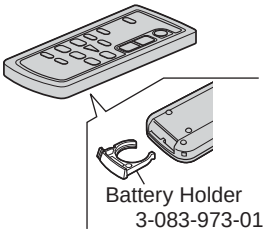
Rechargeable battery pack
NP-FP30 (1)
⚠ A-1082-950-A (US, CND)
⚠ A-1082-951-A
(EXCEPT US, CND)

A/V connecting cable (1)
1-823-156-51

21-pin adaptor (1)
1-770-783-21
(HC22E/HC32E)

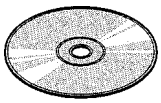
Conversion 2P adaptor (1)
⚠ 1-569-008-12
(HC21/HC32: E)

Conversion 2P adaptor (1)
⚠ 1-569-007-12 (JE)

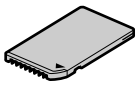


Battery Holder
3-083-973-01

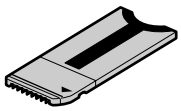
Wireless Remote Commander
RMT-831 (1)
1-477-898-41
(HC32/HC32E/HC33/HC33E)
RMT-830
1-477-898-71
(HC19E/HC21/HC21E/HC22E)



CD-ROM
(SPVD-012 2005 USB Driver)
(Picture Package Ver. 1.5) (1)
2-515-350-01 (EXCEPT HC33E)
2-586-797-01 (HC21E/HC33E)



Memory Stick Duo (1)
(not supplied)
(HC33/HC33E)



Memory Stick Duo adaptor (1)
(not supplied)
(HC33/HC33E)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Checking supplied accessories.

Other accessories

2-584-905-11 MANUAL, INSTRUCTION (ENGLISH) (HC21: US, CND, E/HC32: CND, E)
2-584-905-21 MANUAL, INSTRUCTION (FRENCH) (HC21: CND)
2-584-905-31 MANUAL, INSTRUCTION (SPANISH) (HC21: E/HC32: E)
2-584-905-41 MANUAL, INSTRUCTION (PORTUGUESE) (HC21: E/HC32: E)
2-584-905-51 MANUAL, INSTRUCTION (TRADITIONAL CHINESE) (HC21: E/HC32: E)

2-584-905-61 MANUAL, INSTRUCTION (KOREAN) (HC21: KR/HC32: KR)
2-584-906-11 MANUAL, INSTRUCTION (ENGLISH) (HC32: US, CND, JE/HC32E: JE)
2-584-906-21 MANUAL, INSTRUCTION (FRENCH) (HC32: CND)
2-584-906-31 MANUAL, INSTRUCTION (SPANISH) (HC32: JE/HC32E: JE)
2-584-906-41 MANUAL, INSTRUCTION (PORTUGUESE) (HC32: JE/HC32E: JE)

2-584-907-11 MANUAL, INSTRUCTION (ENGLISH) (HC32E: AEP, UK)
2-584-907-21 MANUAL, INSTRUCTION (FRENCH) (HC32E: AEP)
2-584-907-31 MANUAL, INSTRUCTION (SPANISH, PORTUGUESE) (HC32E: AEP)
2-584-907-41 MANUAL, INSTRUCTION (ITALIAN, GREEK) (HC32E: AEP)
2-584-907-51 MANUAL, INSTRUCTION (GERMAN, DUTCH) (HC32E: AEP)

2-584-907-61 MANUAL, INSTRUCTION (SWEDISH, RUSSIAN) (HC32E: AEP)
2-584-907-71 MANUAL, INSTRUCTION (DANISH, FINNISH) ((HC32E: NE)
2-584-907-81 MANUAL, INSTRUCTION (POLISH, CZECH) (HC32E: EE)
2-584-907-91 MANUAL, INSTRUCTION (HUNGARIAN, SLOVAKIAN) (HC32E: EE)
2-586-501-11 MANUAL, INSTRUCTION (ENGLISH) (HC17E: AEP/HC19E: AEP, UK/HC21E: E, HK/HC22E: AEP, UK/HC32E: E, HK, AUS)

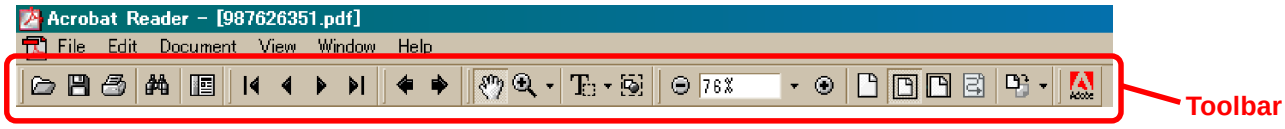
2-586-501-21 MANUAL, INSTRUCTION (FRENCH) (HC17E: AEP/HC19E: AEP/HC21E: E/HC22E: AEP/HC32E: E)
2-586-501-31 MANUAL, INSTRUCTION (SPANISH) (HC17E/HC19E/HC22E)
2-586-501-41 MANUAL, INSTRUCTION (PORTUGUESE) (HC17E: AEP/HC19E: AEP/HC22E: AEP)
2-586-501-51 MANUAL, INSTRUCTION (ITALIAN) (HC17E: AEP/HC19E: AEP/HC22E: AEP)
2-586-501-61 MANUAL, INSTRUCTION (GREEK) (HC17E: AEP/HC19E: AEP/HC22E: AEP)

2-586-501-71 MANUAL, INSTRUCTION (GERMAN) (HC17E: AEP/HC19E: AEP/HC22E: AEP)
2-586-501-81 MANUAL, INSTRUCTION (DUTCH) (HC17E: AEP/HC19E: AEP/HC22E: AEP)
2-586-501-91 MANUAL, INSTRUCTION (SWEDISH) (HC17E: NE/HC19E: NE/HC22E: NE)
2-586-507-11 MANUAL, INSTRUCTION (RUSSIAN) (HC17E: NE/HC19E: NE/HC22E: NE)
2-586-507-21 MANUAL, INSTRUCTION (DANISH) (HC17E: NE/HC19E: NE/HC22E: NE)

2-586-507-31 MANUAL, INSTRUCTION (FINNISH) (HC17E: NE/HC19E: NE/HC22E: NE)
2-586-507-41 MANUAL, INSTRUCTION (POLISH) (HC17E: EE/HC19E: EE/HC22E: EE)
2-586-507-51 MANUAL, INSTRUCTION (CZECH) (HC17E: EE/HC19E: EE/HC22E: EE)
2-586-507-61 MANUAL, INSTRUCTION (HUNGARIAN) (HC17E: EE/HC19E: EE/HC22E: EE)
2-586-507-71 MANUAL, INSTRUCTION (SLOVAKIAN) (HC17E: EE/HC19E: EE/HC22E: EE)

2-586-507-81 MANUAL, INSTRUCTION (ARABIC) (HC21E: E/HC32E: E)
2-586-507-91 MANUAL, INSTRUCTION (PERSIAN) (HC21E: E/HC32E: E)
2-586-574-11 MANUAL, INSTRUCTION (TRADITIONAL CHINESE) (HC21E: HK/HC32E: HK)
2-586-574-21 MANUAL, INSTRUCTION (SIMPLIFIED CHINESE) (HC21E: E/HC32E: E)

[Description of main button functions on toolbar of the Adobe Acrobat Reader Ver5.0 (for Windows)]



Printing a text

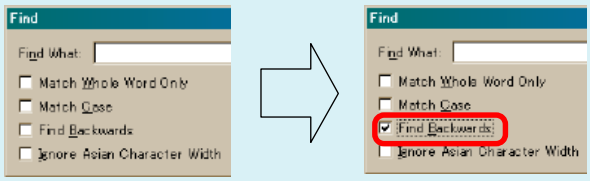
1. Click the Print button .
2. Specify a printer, print range, number of copies, and other options, and then click [OK].

Application of printing:
To set a range to be printed within a page, select the graphic selection tool and drag on the page to enclose a range to be printed, and then click the Print button.

Finding a text

1. Click the Find button .
2. Enter a character string to be found into a text box, and click the [Find]. (Specify the find options as necessary)

Application to the Service Manual:
To execute "find" from current page toward the previous pages, select the check box "Find Backward" and then click the "Find".



3. Open the find dialog box again, and click the [Find Again] and you can find the matched character strings displayed next. (Character strings entered previously are displayed as they are in the text box.)

Application to the Service Manual:
The parts on the drawing pages (block diagrams, circuit diagrams, printed circuit boards) and parts list pages in a text can be found using this find function. For example, find a Ref. No. of IC on the block diagram, and click the [Find Again] continuously, so that you can move to the Ref. No. of IC on the circuit diagram or printed circuit board diagram successively.
Note: The find function may not be applied to the Service Manual depending on the date of issue.

Switching a page

- To move to the first page, click the .
- To move to the last page, click the .
- To move to the previous page, click the .
- To move to the next page, click the .

Reversing the screens displayed once

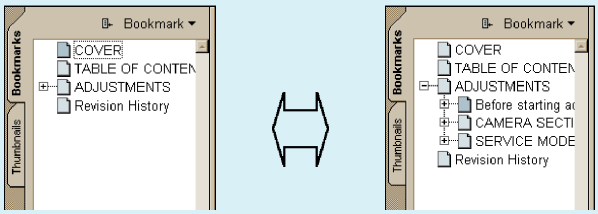
- To reverse the previous screens (operation) one by one, click the .
- To advance the reversed screens (operation) one by one, click the .

Application to the Service Manual:
This function allows you to go and back between circuit diagram and printed circuit board diagram, and accordingly it will be convenient for the voltage check.

Moving with link

1. Select either palm tool , zoom tool , text selection tool , or graphic selection tool .
2. Place the pointer in the position in a text where the link exists (such as a button on cover and the table of contents page, or blue characters on the removal flowchart page or drawing page), and the pointer will change to the forefinger form .
3. Then, click the link. (You will go to the link destination.)

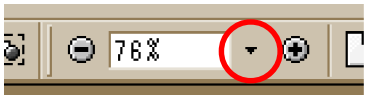
Moving with bookmark:
Click an item (text) on the bookmark pallet, and you can move to the link destination. Also, clicking can display the hidden items.
(To go back to original state, click)



Zooming or rotating the screen display

"Zoom in/out"

- Click the triangle button in the zoom control box to select the display magnification. Or, you may click or for zooming in or out.



"Rotate"

- Click rotate tool , and the page then rotates 90 degrees each.

Application to the Service Manual:
The printed circuit board diagram you see now can be changed to the same direction as the set.

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2005.01	Official Release	—	—

DCR-HC17E/HC19E/HC21/HC21E/HC22E/ HC32/HC32E/HC33/HC33E

RMT-830/831

Ver 1.0 2005.01
Revision History

SECTION 6 ADJUSTMENTS

ADJ

Link

- Before starting adjustments
  - Adjusting items when replacing main parts and boards (Non MS model)
  - Adjusting items when replacing main parts and boards (MS model)
- CAMERA SECTION ADJUSTMENTS
  - PREPARATIONS BEFORE ADJUSTMENTS
  - INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA (Non MS model)
  - INITIALIZATION OF 8, A, B, C, D, E, F, 18, 1A, 1B, 1C, 1E, 1F PAGE DATA (MS model)
  - CAMERA SYSTEM ADJUSTMENTS
  - ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS
  - LCD SYSTEM ADJUSTMENTS
- MECHANISM SECTION ADJUSTMENTS
  - HOW TO ENTER RECORD MODE WITHOUT CASSETE
  - HOW TO ENTER PLAYBACK MODE WITHOUT CASSETE
  - TAPE PATH ADJUSTMENT
- VIDEO SECTION ADJUSTMENTS
  - PREPARATIONS BEFORE ADJUSTMENTS
  - SYSTEM CONTROL SYSTEM ADJUSTMENTS
  - SERVO AND RF SYSTEM ADJUSTMENTS
  - VIDEO SYSTEM ADJUSTMENTS
  - AUDIO SYSTEM ADJUSTMENTS (Non MS model)
  - AUDIO SYSTEM ADJUSTMENTS (MS model)
- SERVICE MODE
  - ADJUSTMENT REMOTE COMMANDER
  - DATA PROCESS
  - SERVICE MODE

NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

SONY®

DCR-HC17E/HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E

9-876-782-51

Sony EMCS Co.

2004L0500-1

© 2004.12

Published by DI Technical Support Section

TABLE OF CONTENTS

Section	Title	Page
6.	**ADJUSTMENTS**	
1.	Before Starting Adjustments	6-1
1-1.	Adjusting Items when Replacing Main Parts and Boards (Non MS model)	6-2
1-2.	Adjusting Items when Replacing Main Parts and Boards (MS model)	6-4
6-1.	Camera Section Adjustments	6-6
1-1.	Preparations before Adjustments (CAMERA Section)	6-6
1-1-1.	List of Service Tools	6-6
1-1-2.	Preparations	6-7
1-1-3.	Precaution	6-8
1.	Setting the Switch	6-8
2.	Order of Adjustments	6-8
3.	Subjects	6-9
4.	Preparing the Flash Adjustment Box	6-10
1-2.	Initialization of 8, A, C, D, E, F, 1C, 1F Page Data (Non MS model)	6-11
1-2-1.	Initialization of A, D Page Data	6-11
1.	Initializing of A, D Page Data	6-11
2.	Modification of A, D Page Data	6-11
3.	A Page Table	6-12
4.	D Page Table	6-12
1-2-2.	Initialization of 8, C, 1C Page Data	6-13
1.	Initializing of 8, C, 1C Page Data	6-13
2.	Modification of 8, C, 1C Page Data	6-13
3.	8 Page Table	6-14
4.	C Page Table	6-14
5.	1C Page Table	6-15
1-2-3.	Initialization of E, F, 1F Page Data	6-16
1.	Initializing of E, F, 1F Page Data	6-16
2.	Modification of E, F, 1F Page Data	6-16
3.	E Page Table	6-17
4.	F Page Table	6-17
5.	1F Page Table	6-19
1-3.	Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F Page Data (MS model)	6-20
1-3-1.	Initialization of A, B, D, 1A, 1B Page Data	6-20
1.	Initializing of A, B, D, 1A, 1B Page Data	6-20
2.	Modification of A, B, D, 1A, 1B Page Data	6-20
3.	A Page Table	6-21
4.	B Page Table	6-21
5.	D Page Table	6-21
6.	1A Page Table	6-22
7.	1B Page Table	6-22
1-3-2.	Initialization of 8, C, 18, 1C Page Data	6-23
1.	Initializing of 8, C, 18, 1C Page Data	6-23
2.	Modification of 8, C, 18, 1C Page Data	6-23
3.	8 Page Table	6-24
4.	C Page Table	6-25
5.	18 Page Table	6-26
6.	1C Page Table	6-27
1-3-3.	Initialization of E, F, 19, 1E, 1F Page Data	6-28
1.	Initializing of E, F, 19, 1E, 1F Page Data	6-28
2.	Modification of E, F, 19, 1E, 1F Page Data	6-28
3.	E Page Table	6-29
4.	F Page Table	6-29
5.	19 Page Table	6-31
6.	1E Page Table	6-31
7.	1F Page Table	6-32
1-4.	Camera System Adjustments	6-33
1.	36MHz Origin Oscillation Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-33
2.	Hall Adjustment	6-34
3.	Flange Back Adjustment (Using the minipattern box or flange back adjustment jig)	6-35
4.	Flange Back Adjustment (Using the flange back adjustment chart and subject more than 500 m away)	6-36
4-1.	Flange Back Adjustment (1)	6-36
4-2.	Flange Back Adjustment (2)	6-37
5.	Flange Back Check	6-37
6.	Optical Axis Adjustment	6-38
7.	Picture Frame Setting (Color reproduction adjustment frame)	6-39
8.	Picture Frame Setting (Center frame)	6-40
9.	E.I. No. standard data input	6-40
10.	Mechanical Shutter Adjustment (DCR-HC32/HC32E/HC33/HC33E)	6-41
11.	Color Reproduction Adjustment	6-42
12.	Auto White Balance Standard Data Input	6-43
13.	LV Standard Data Input	6-43
14.	Auto White Balance Adjustment	6-44
15.	Auto White Balance Check	6-45
16.	MAX GAIN Adjustment	6-46
17.	Steadyshot Check	6-47
1-5.	Electronic Viewfinder System Adjustments	6-48
1.	EVF Automatic Adjustment (LB-109 board)	6-48
1-6.	LCD System Adjustments	6-49
1.	LCD Automatic Adjustment (PD-237 board)	6-49
2.	V-COM Adjustment (PD-237 board)	6-50
3.	Transmissive Mode White Balance Adjustment (PD-237 board)	6-50
2-2.	Mechanism Section Adjustments	6-51
2-1.	How To Enter Record Mode Without Cassette	6-51
2-2.	How To Enter Playback Mode Without Cassette	6-51
2-3.	Tape Path Adjustment	6-51
1.	Preparation for Adjustment	6-51
2.	Procedure After Operations	6-51
3-3.	Video Section Adjustments	6-52
3-1.	Preparations Before Adjustments	6-52
3-1-1.	Equipment Required	6-52
3-1-2.	Precautions on Adjusting	6-52
3-1-3.	Adjusting Connectors	6-52
3-1-4.	Connecting the Equipment	6-53
3-1-5.	Alignment Tapes	6-54
3-1-6.	Input/Output Level and Impedance	6-54
3-2.	System Control System Adjustments	6-55
1.	Initialization of 8, A, C, D, E, F, 1C,1F Page Data (Non MS model)	6-55
2.	Touch Panel Adjustment (Non MS model)	6-55
3.	Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F Page Data (MS model)	6-56
4.	Touch Panel Adjustment (MS model)	6-56
5.	Node Unique ID No. Input	6-57
3-3.	Servo and RF System Adjustments	6-59
1.	CAP FG Duty Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-59
2.	Switching Position Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-60
3.	Error Rate Check (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-61
3-1.	Preparations Before Adjustments	6-61
3-2.	Error Rate Check	6-61

Section	Title	Page
3-4.	Video System Adjustments	6-62
1.	S VIDEO OUT Y Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-62
2.	S VIDEO OUT Chroma Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-63
3.	VIDEO OUT Level Check (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-64
3-5.	Audio System Adjustments (Non MS model)	6-65
1.	Playback Level Check	6-65
2.	Overall Level Characteristics Check	6-65
3.	Overall Distortion Check	6-66
4.	Overall Noise Level Check	6-66
5.	Overall Separation Check	6-66
3-6.	Audio System Adjustments (MS model)	6-67
1.	Playback Level Check	6-67
2.	Overall Level Characteristics Check	6-67
3.	Overall Distortion Check	6-68
4.	Overall Noise Level Check	6-68
5.	Overall Separation Check	6-68
6-4.	Service Mode	6-69
4-1.	Adjustment Remote Commander	6-69
1.	Using the Adjustment Remote Commander	6-69
2.	Precautions Upon Using the Adjustment Remote Commander	6-69
4-2.	Data Process	6-70
4-3.	Service Mode	6-71
1.	Setting the Test Mode	6-71
1-1.	Setting the Test Mode (Non MS model)	6-71
1-2.	Setting the Test Mode (MS model)	6-71
2.	Emergence Memory Address (Non MS model)	6-71
2-1.	Emergency Memory Address (Camera section)	6-71
2-2.	EMG Code (Emergency Code)	6-71
3.	Emergence Memory Address (MS model)	6-72
3-1.	Emergency Memory Address (Camera section)	6-72
3-2.	EMG Code (Emergency Code)	6-72
4.	Emergence Memory Address (Mechanism section)	6-72
4-1.	EMG Code (Emergency Code)	6-73
4-2.	MSW Code	6-74
5.	Bit Value Discrimination	6-75
6.	Jack Check (Non MS model)	6-75
6-1.	Jack Check (1) (Handycam station) (DCR-HC22E)	6-75
6-2.	Jack Check (2)	6-75
7.	Jack Check (MS model)	6-76
7-1.	Jack Check (1) (Handycam station)	6-76
7-2.	Jack Check (2)	6-76
8.	Switch Check (Non MS model)	6-76
8-1.	Switch Check (1)	6-76
8-2.	Switch Check (2)	6-76
8-3.	Switch Check (3)	6-77
8-4.	Switch Check (4)	6-77
9.	Switch Check (MS model)	6-78
9-1.	Switch Check (1)	6-78
9-2.	Switch Check (2)	6-78
9-3.	Switch Check (3)	6-78
9-4.	Switch Check (4)	6-79
10.	LED, IR Light Check (Non MS model)	6-80
11.	LED, IR Light Check (MS model)	6-80
12.	Record of Use Check (1)	6-80
13.	Record of Use Check (2) (Non MS model)	6-81
14.	Record of Use Check (3) (MS model)	6-82
15.	Record of Use Check (4)	6-82
16.	Record of Self-diagnosis Check	6-83

* The camera optical axis frame is shown on page 6-84.
The camera color reproduction frame is shown on page 6-85.

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

SECTION 6
ADJUSTMENTS

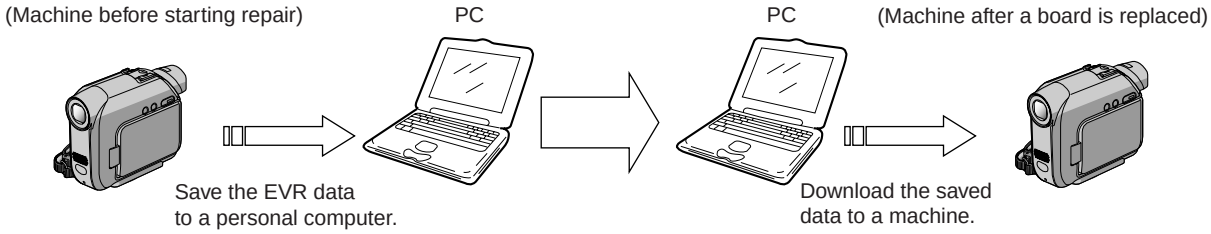
1. Before starting adjustments

EVR Data Re-writing Procedure When Replacing Board

The data that is stored in the repair board, is not necessarily correct.
Perform either procedure 1 or procedure 2 or procedure 3 when replacing board.

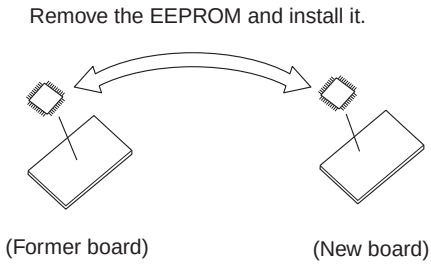
Procedure 1

Save the EVR data of the machine in which a board is going to be replaced. Download the saved data after a board is replaced.



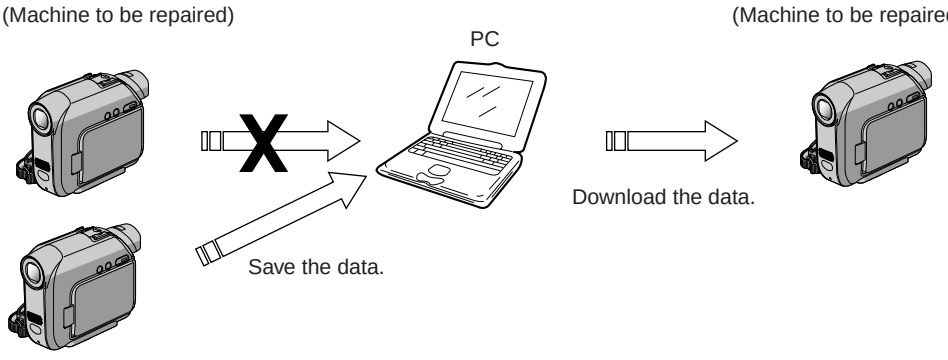
Procedure 2

Remove the EEPROM from the board of the machine that is going to be repaired. Install the removed EEPROM to the replaced board.



Procedure 3

When the data cannot be saved due to defective EEPROM, or when the EEPROM cannot be removed or installed, save the data from the same model of the same destination, and download it.



After the EVR data is saved and downloaded, check the respective items of the EVR data.
(Refer to page 6-3 or 6-5 for the items to be checked)

1-1. Adjusting items when replacing main parts and boards (Non MS model)

• Adjusting items when replacing main parts

When replacing main parts, adjust the items indicated by ● in the following table.

Note 1: When replacing the drum assy or the mechanism deck, reset the data of page: 7, address: A8 to AB to "00". (Refer to "Record of Use check" of "6-4. SERVICE MODE")

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E

Note 3: DCR-HC32/HC32E/HC33/HC33E model only.

Adjustment Section	Adjustment	Replaced part																		
		Block replacement							Mounted part replacement											
		Lens device	LCD block LCD901 (LCD panel, Touch panel)	LCD block D901 (Back light LED)	EVF block LCD902 (LCD panel)	Mechanism deck (Note 1)	Mechanism deck M901 (Drum assembly) (Note 1)	Mechanism deck MD block	CD-533 board IC101 (CCD imager)	LB-109 board D303 (Back light (EVF))	PD-237 board IC602 (LCD drive)	SI-042 board SE601, 602 (PITCH, YAW sensor)	VC-376 board IC3001, X3001 (Timing generator)	VC-376 board IC3002 (S/H, AGC, A/D converter)	VC-376 board IC6001 (DV signal process)				
Initialization of 8, A, C, D, E, F, 1C, 1F page data	Initialization of A, D page data																			
	Initialization of 8, C, 1C page data																			
	Initialization of E, F, 1F page data																			
Camera	36MHz origin oscillation adj.												●							
	HALL adj.	●																		
	Flange back adj.	●							●											
	Optical axis adj.	●							●											
	F No. standard data input	●							●											
	Mechanical shutter adj. (Note 3)	●																		
	Color reproduction adj.								●					●						
	Auto white balance standard data input								●					●						
	LV standard data input								●					●						
	Auto white balance adj.								●					●						
	MAX GAIN adj.								●					●						
	Steadyshot check											●								
EVF	EVF automatic adj.				●					●					●					
LCD	LCD automatic adj.										●				●					
	V-COM adj.		●								●									
	Transmissive mode white balance adj.		●	●							●									
Mechanism	Tape path adj.					●	●	●												
System control	Touch panel adj.		●																	
	Node uniqe ID No. input																			
Servo, RF	CAP FG duty adj.					●		●												
	Switching position adj.					●	●	●												
	Error rate check					●	●	●							●					
Video	S VIDEO OUT Y level adj.														●					
	S VIDEO OUT chroma level adj.														●					

Table 6-1-1 (1)

• **Adjusting items when replacing a board or EEPROM**

When replacing a board or EEPROM, adjust the items indicated by ● in the following table.

Adjustment Section	Adjustment	Replaced part: CD-533 board (COMPLETE)	LB-109 board (COMPLETE)	PD-237 board (COMPLETE)	SI-042 board (COMPLETE)	VC-376 board (COMPLETE)	VC-376 board IC8602 (EEP ROM)	Supporting RadarW
Initialization of 8, A, C, D, E, F, 1C, 1F page data	Initialization of A, D page data					●	●	
	Initialization of 8, C, 1C page data					●	●	
	Initialization of E, F, 1F page data					●	●	
Camera	36MHz origin oscillation adj.					●	●	
	HALL adj.					●	●	●
	Flange back adj.	●				●	●	●
	Optical axis adj.	●				●	●	
	F No.standard data input	●				●	●	●
	Mechanical shutter adj. (Note 3)					●	●	●
	Color reproduction adj.	●				●	●	
	Auto white balance standard data input	●				●	●	●
	LV standard data input	●				●	●	●
	Auto white balance adj.	●				●	●	●
	MAX GAIN adj.	●				●	●	●
	Steadyshot check				●	●	●	●
EVF	EVF automatic adj.					●	●	●
LCD	LCD automatic adj.			●		●	●	●
	V-COM adj.			●		●	●	
	Transmissive mode white balance adj.			●		●	●	
Mechanism	Tape path adj.							
System control	Touch panel adj.					●	●	
	Node uniqe ID No. input					●	●	
Servo, RF	CAP FG duty adj.					●	●	●
	Switching position adj.					●	●	●
	Error rate check					●	●	●
Video	S VIDEO OUT Y level adj.					●	●	
	S VIDEO OUT chroma level adj.					●	●	

Table 6-1-1 (2)

1-2. Adjusting items when replacing main parts and boards (MS model)

• Adjusting items when replacing main parts

When replacing main parts, adjust the items indicated by ● in the following table.

Note 1: When replacing the drum assy or the mechanism deck, reset the data of page: 7, address: A8 to AB to "00". (Refer to "Record of Use check" of "6-4. SERVICE MODE")

Note 2: MS model: DCR-HC32/HC32E/HC33/HC33E

Adjustment Section	Adjustment	Replaced part																				
		Block replacement							Mounted part replacement													
		Lens device	LCD block LCD901	(LCD panel, Touch panel)	LCD block D901	(Back light LED)	EVF block LCD902	(LCD panel)	Mechanism deck (Note 1)	Mechanism deck M901	(Drum assembly) (Note 1)	Mechanism deck MD block	CD-533 board IC101	(CCD imager)	LB-109 board D303	(Back light (EVF))	PD-237 board IC602	(LCD drive)	SI-042 board SE601, 602	(PITCH, YAW sensor)	VC-377 board IC3101, X3101	(Timing generator)	VC-377 board IC3102	(S/H, AGC, A/D converter)	VC-377 board IC4001	(Video/Audio DSP, D/A converter etc)	VC-377 board IC4201	(DV signal process)	VC-377 board IC4301	(REC/PB AMP)	VC-377 board IC4401	(Video IN/OUT)	VC-377 board IC5102	(HI/DS control)	VC-377 board IC7001	(EVF drive)
Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F page data	Initialization of A, B, D, 1A, 1B page data																																
	Initialization of 8, C, 18, 1C page data																																
	Initialization of E, F, 19, 1E, 1F page data																																
Camera	36MHz origin oscillation adj.																				●									●			
	HALL adj.	●																															
	Flange back adj.	●											●																				
	Optical axis adj.	●											●																				
	F No. standard data input	●											●																				
	Mechanical shutter adj.	●																															
	Color reproduction adj.												●										●										
	Auto white balance standard data input												●										●										
	LV standard data input												●										●										
	Auto white balance adj.												●										●										
	MAX GAIN adj.												●										●										
	Steadyshot check																		●														
EVF	EVF automatic adj.						●								●										●								
LCD	LCD automatic adj.																●								●								
	V-COM adj.		●														●																
	Transmissive mode white balance adj.		●		●												●																
Mechanism	Tape path adj.								●		●																						
System control	Touch panel adj.		●																														
	Node uniqe ID No. input																																
Servo, RF	CAP FG duty adj.								●			●																					
	Switching position adj.								●	●		●																					
	Error rate check								●	●		●															●	●					
Video	S VIDEO OUT Y level adj.																								●					●			
	S VIDEO OUT chroma level adj.																								●					●			

Table 6-1-2 (1)

• Adjusting items when replacing a board or EEPROM

When replacing a board or EEPROM, adjust the items indicated by ● in the following table.

Adjustment Section	Adjustment	Replaced part: CD-533 board (COMPLETE)	LB-109 board (COMPLETE)	PD-237 board (COMPLETE)	SI-042 board (COMPLETE)	VC-377 board (COMPLETE)	VC-377 board IC5302 (EEP ROM)	VC-377 board IC5101 (EEP ROM)	Supporting RadarW
Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F page data	Initialization of A, B, D, 1A, 1B page data					●		●	
	Initialization of 8, C, 18, 1C page data					●	●		
	Initialization of E, F, 19, 1E, 1F page data					●	●		
Camera	36MHz origin oscillation adj.					●	●		
	HALL adj.					●	●		●
	Flange back adj.	●				●	●		●
	Optical axis adj.	●				●	●		
	F No.standard data input	●				●	●		●
	Mechanical shutter adj.					●	●		●
	Color reproduction adj.	●				●	●		●
	Auto white balance standard data input	●				●	●		●
	LV standard data input	●				●	●		●
	Auto white balance adj.	●				●	●		●
	MAX GAIN adj.	●				●	●		●
	Steadyshot check				●	●	●		●
EVF	EVF automatic adj.		●			●	●		●
LCD	LCD automatic adj.			●		●	●		●
	V-COM adj.			●		●	●		
	Transmissive mode white balance adj.			●		●	●		
Mechanism	Tape path adj.								
System control	Touch panel adj.					●		●	
	Node uniqe ID No. input					●	●		
Servo, RF	CAP FG duty adj.					●	●		●
	Switching position adj.					●	●		●
	Error rate check					●	●		●
Video	S VIDEO OUT Y level adj.					●	●		
	S VIDEO OUT chroma level adj.					●	●		

Table 6-1-2 (2)

Note 3: IC5202 (Flash memory) on the VC-377 board cannot be replaced.

6-1. CAMERA SECTION ADJUSTMENTS

1-1. PREPARATIONS BEFORE ADJUSTMENTS (CAMERA SECTION)

1-1-1. List of Service Tools

- Oscilloscope
- Color monitor
- Vectorscope
- AC power adapter
- Frequency counter

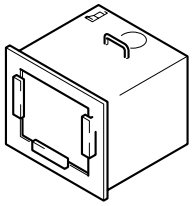
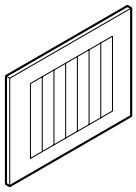
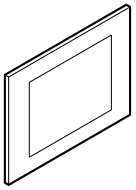
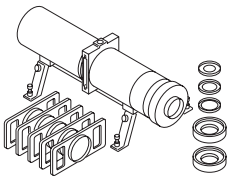
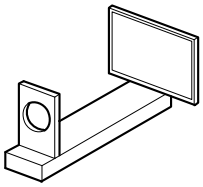
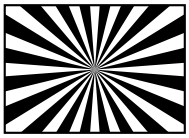
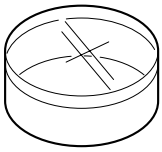
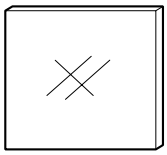
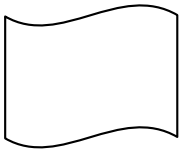
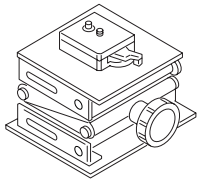
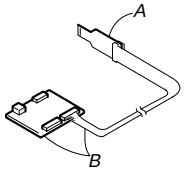
J-1 Adjustment remote commander J-6082-053-B	J-2  Pattern box PTB-450 J-6082-200-A or Small pattern box PTB-1450 J-6082-557-A	J-3  Color bar chart For PTB-450: J-6020-250-A For PTB-1450: J-6082-559-A
J-4  Clear chart For PTB-450: J-6080-621-A For PTB-1450: J-6082-560-A	J-5  Minipattern box J-6082-353-B	J-6  Flange back adjustment jig J-6082-563-A
J-7  Siemens star chart J-6080-875-A	J-8  Filter for color temperature correction (C14) J-6080-058-A	J-9  ND filter 1.0 J-6080-808-A ND filter 0.4 J-6080-806-A ND filter 0.1 J-6080-807-A
J-10  Back ground paper J-2501-130-A	J-11  Camera table J-6082-384-A	J-12  A: CPC-15 J-6082-564-A B: I/F unit for LANC control J-6082-521-A

Fig. 6-1-1

1-1-2. Preparations

Note: Before perform the adjustment, check that the data of page: 0, address: 10 is “00”.
If not, select page: 0, address: 10, and set data “00”.

1) Connect the equipment for adjustments according to Fig. 6-1-3.

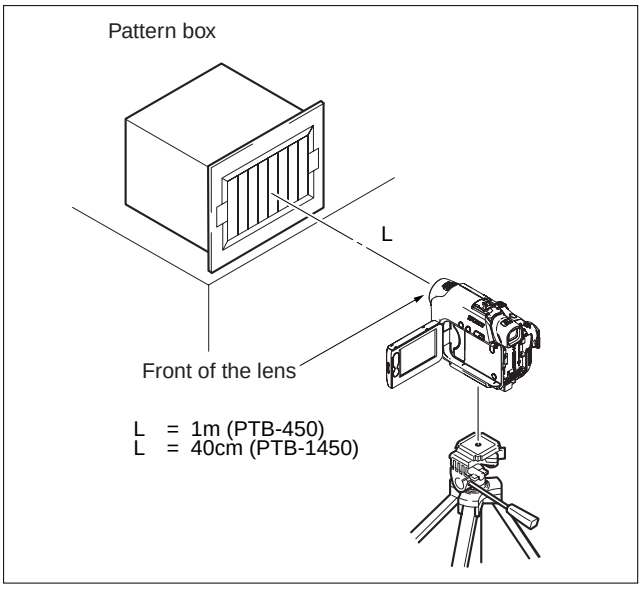


Fig. 6-1-2

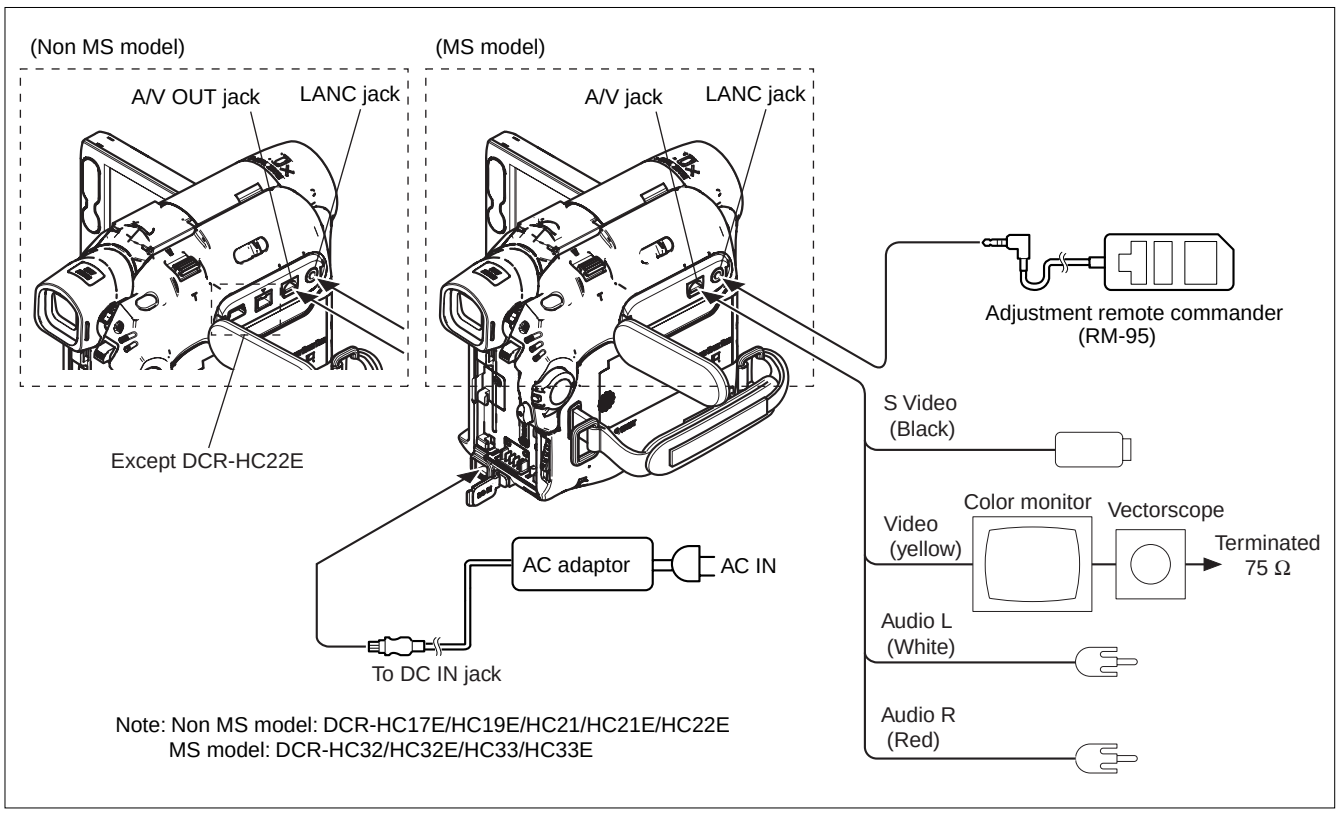


Fig. 6-1-3

1-1-3. Precaution

1. Setting the Switch

Unless otherwise specified, set the switches as follows and perform adjustments without loading cassette.

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

(Non MS model)

1. POWER switch (SS10300 block) ..... CAMERA
2. LENS COVER switch (Lens block) ..... OPEN
3. NIGHTSHOT PLUS switch (Lens block) ..... OFF
4. BACK LIGHT (FP-187 flexible) ..... OFF
5. PROGRAM AE (MENU setting) ..... AUTO
6. EXPOSURE (MENU setting) ..... AUTO
7. WHITE BAL (MENU setting) ..... AUTO
8. FOCUS (MENU setting) ..... MANUAL
9. D ZOOM (MENU setting) ..... OFF
10. WIDE SEL (MENU setting) 4:3
11. STEADY SHOT (MENU setting) ..... OFF
12. P EFFECT (MENU setting) ..... OFF
13. DEMO MODE (MENU setting) ..... OFF

(MS model)

1. POWER switch (SS10300 block) ..... CAMERA-TAPE
2. LENS COVER switch (Lens block) ..... OPEN
3. NIGHTSHOT PLUS switch (Lens block) ..... OFF
4. BACK LIGHT (FP-187 flexible) ..... OFF
5. PROGRAM AE (MENU setting) ..... AUTO
6. EXPOSURE (MENU setting) ..... AUTO
7. WHITE BAL. (MENU setting) ..... AUTO
8. FOCUS (MENU setting) ..... MANUAL
9. COLOR SLOW S (MENU setting) ..... OFF
10. DIGITAL ZOOM (MENU setting) ..... OFF
11. WIDE SELECT (MENU setting) 4:3
12. STEADY SHOT (MENU setting) ..... OFF
13. D EFFECT (MENU setting) ..... OFF
14. PICT EFFECT (MENU setting) ..... OFF
15. DEMO MODE (MENU setting) ..... OFF

2. Order of Adjustments

Basically carry out adjustments in the order given.

Color bar chart (Color reproduction adjustment frame)

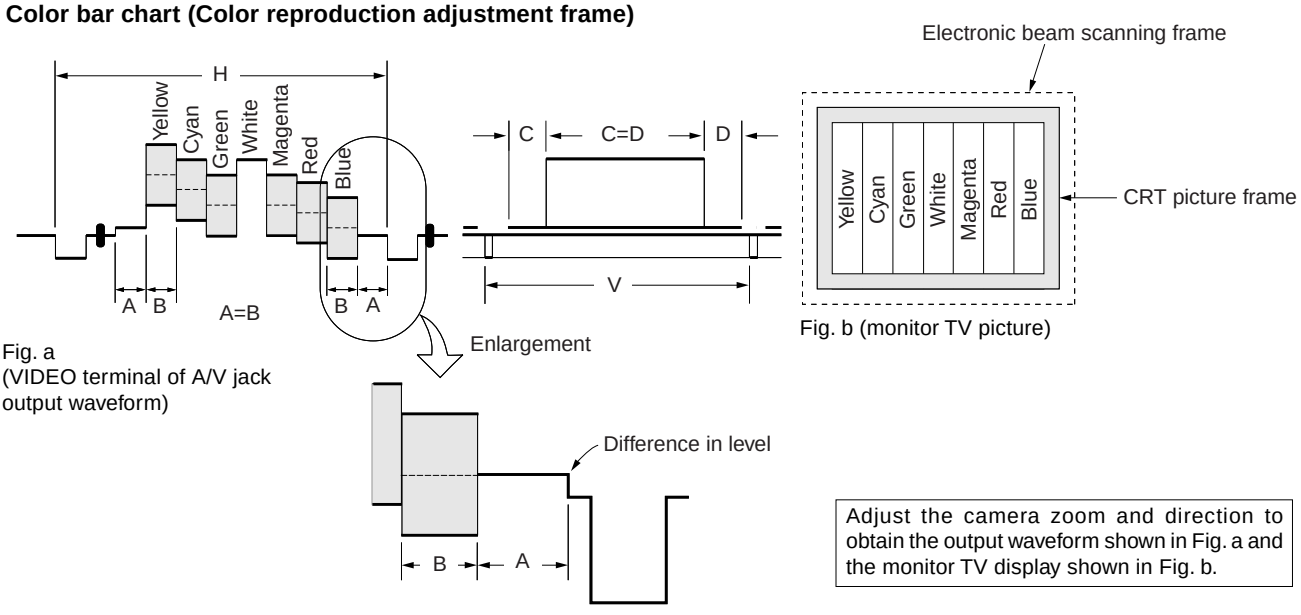


Fig. 6-1-4

3. Subjects

1) Color bar chart (Color reproduction adjustment frame)
   When performing adjustments using the color bar chart, adjust the picture frame as shown in Fig. 6-1-4. (Color reproduction adjustment frame)
2) Mixed color compensation chart (Color reproduction adjustment frame)
   Remove the color bar chart from the pattern box and insert a mixed color compensation chart in its place. (Do not perform zoom operations during this time)
3) Chart for flange back adjustment
   Join together a piece of white A0 size paper (1189mm × 841 mm) and a piece of black paper to make the chart shown in Fig. 6-1-5.

Note: Use a non-reflecting and non-glazing vellum paper. The size must be A0 or larger and the joint between the white and black paper must not have any undulations.

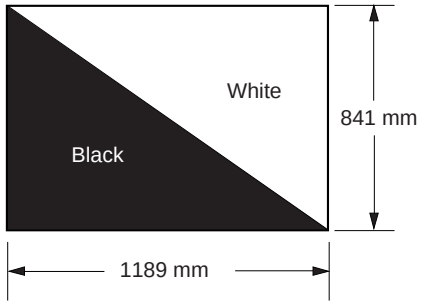


Fig. 6-1-5

4. Preparing the Flash Adjustment Box

A dark room is required to provide an accurate flash adjustment. If it is not available, prepare the flash adjustment box as given below;

1) Provide woody board A, B and C of 15 mm thickness.

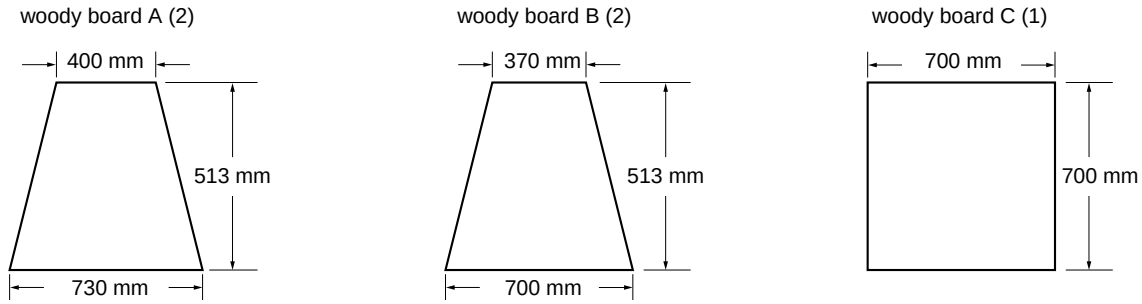


Fig. 6-1-6

2) Apply black mat paint to one side of woody board A and B.
3) Attach background paper (J-2501-130-A) to woody board C.
4) Assemble so that the black sides and the background paper side of woody board A, B and C are internal. (Fig. 6-1-7)

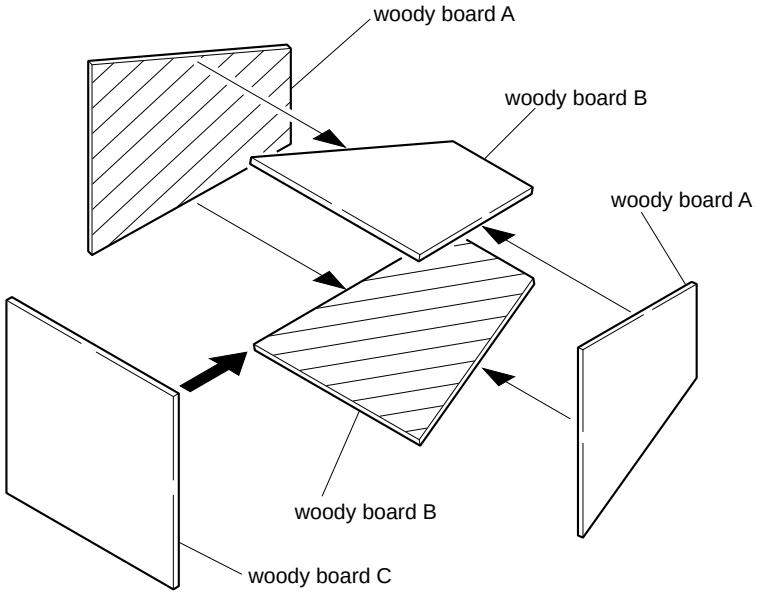


Fig. 6-1-7

1-2. INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA (Non MS model)

Note 1: If reading/writing data on pages 1C, 1F, set data: 01 to page: 0, address: 10, and then select pages C, F. By this data setting, the pages 1C, 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E

1-2-1. Initialization of A, D Page Data

Note: Check that the data of page: 0, address: 10 is "00".

1. Initializing of A, D Page Data

Note 1: If "Initialization of Pages A, D" is executed, all data on pages A, D are initialized.

Note 2: If the A, D page data has been initialized, the following adjustments need to be performed again.
1) Modification of A, D page data
2) Touch panel adjustment

Note 3: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Adjustment Page	A
Adjustment Address	10 to FF
Adjustment Page	D
Adjustment Address	10 to 7F

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	7	03		Set the following data. 01: NTSC model 81: PAL model
4	7	00		Set the following data. 20: Initializing A page 22: Initializing D page 28: Initializing A and D pages
5	7	01		Set the following data, and press PAUSE button. 20: Initializing A page 22: Initializing D page 28: Initializing A and D pages
6	7	02		Check the data changes to "01".
7				Perform "Modification of A, D Page Data"

2. Modification of A, D Page Data

If the A, D page data has been initialized, change the data of the"Fixed data-2" address shown in the following table by manual input.

Modifying method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note 1: If copy the data built in the different model, the camcorder may not operate.
3) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
4) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after completing modification A, D page data:

Order	Page	Address	Data	Procedure
1	2	00	29	
2	2	01	29	Press PAUSE button.

Note 2: If the following symptoms occur after completing of the"Modification A, D page data", check that the data of the "Fixed data-2" addresses of A, D page are same as those of the same model of the same destination.
1) The power is shut off so that unit cannot operate.

3. A Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, D Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, D Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10 to 19			Fixed data-1 (Initialized data)
1A			Fixed data-2
1B			
1C to 30			Fixed data-1 (Initialized data)
31			Fixed data-2
32			
33 to 38			Fixed data-1 (Initialized data)
39			Fixed data-2
3A to 43			Fixed data-1 (Initialized data)
44			Fixed data-2
45 to 4A			Fixed data-1 (Initialized data)
4B			Fixed data-2
4C			Fixed data-1 (Initialized data)
4D			Fixed data-2
4E			Fixed data-1 (Initialized data)
4F			Fixed data-2
50 to 52			Fixed data-1 (Initialized data)
53			Fixed data-2
54			
55			
56 to 79			Fixed data-1 (Initialized data)
7A			Fixed data-2
7B			
7C to 7F			Fixed data-1 (Initialized data)
80			Fixed data-2
81			
82	CB	CC	Touch panel adj
83	20	1D	
84	CF	C4	
85	1C	28	
86 to 8F			Fixed data-1 (Initialized data)
90			Fixed data-2
91 to F0			Fixed data-1 (Initialized data)
F1			Fixed data-2
F2			
F3			
F4 to FF			Fixed data-1 (Initialized data)

4. D Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, D Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, D Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	00	00	Test mode
11			Fixed data-1 (Initialized data)
12			Fixed data-2
13			
14 to 16			Fixed data-1 (Initialized data)
17			Fixed data-2
18			
19			
1A to 21			Fixed data-1 (Initialized data)
22			Fixed data-2
23			
24			
25			
26			
27 to 29			Fixed data-1 (Initialized data)
2A			Fixed data-2
2B			
2C to 36			Fixed data-1 (Initialized data)
37			Fixed data-2
38, 39			Fixed data-1 (Initialized data)
3A			Fixed data-2
3B, 3C			Fixed data-1 (Initialized data)
3D			Fixed data-2
3E, 3F			Fixed data-1 (Initialized data)
40			Fixed data-2
41 to 54			Fixed data-1 (Initialized data)
55			Fixed data-2
56			
57			
58 to 6E			Fixed data-1 (Initialized data)
6F			Fixed data-2
70 to 7F			Fixed data-1 (Initialized data)

1-2-2. Initialization of 8, C, 1C Page Data

Note: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

1. Initializing of 8, C, 1C Page Data

Note 1: If "Initialization of Pages 8, C, 1C" is executed, all data on pages 8, C, 1C are initialized. (Only an individual page cannot be initialized)

Note 2: If the 8, C, 1C page data has been initialized, the following adjustments need to be performed again.
1) Modification of 8, C, 1C page data
2) Electronic viewfinder system adjustments
3) LCD system adjustments
4) Node unique ID No. input
5) Servo, RF system adjustments
6) Video system adjustments.

Adjustment Page	8
Adjustment Address	00 to FF
Adjustment Page	C
Adjustment Address	10 to FF
Adjustment Page	1C
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	3	81		Check that the data is "00".
4	3	80	0C	Press PAUSE button.
5	3	80		Check the data changes to "1C".
6				Perform "Modification of 8, C, 1C Page Data"

2. Modification of 8, C, 1C Page Data

If the 8, C, 1C page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages 8, C, set data: 00 to page: 0, address: 10, and then select pages 8, C.
3) If modification of data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages C. After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after completing modification 8, C, 1C page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.

3. 8 Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 3F	Fixed data-1 (Initialized data)		
40	Fixed data-2		
41 to 4C	Fixed data-1 (Initialized data)		
4D	Fixed data-2		
4E to 79	Fixed data-1 (Initialized data)		
7A	Fixed data-2		
7B			
7C to 89	Fixed data-1 (Initialized data)		
8A	Fixed data-2		
8B to 8D	Fixed data-1 (Initialized data)		
8E	Fixed data-2		
8F			
90 to B2	Fixed data-1 (Initialized data)		
B3	Fixed data-2		
B4 to BE	Fixed data-1 (Initialized data)		
BF	Fixed data-2		
C0 to C3	Fixed data-1 (Initialized data)		
C4	Fixed data-2		
C5			
C6			
C7			
C8			
C9	Fixed data-1 (Initialized data)		
CA	Fixed data-2		
CB			
CC to D5	Fixed data-1 (Initialized data)		
D6	Fixed data-2		
D7			
D8 to FF	Fixed data-1 (Initialized data)		

4. C Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	EE	EE	Switching position adj.
11	00	00	
12	00	00	
13	00	00	
14, 15	Fixed data-1 (Initialized data)		
16	E0	E0	CAP FG duty adj.
17 to 24	Fixed data-1 (Initialized data)		
25	80	80	S VIDEO OUT Y level adj.
26	90	90	S VIDEO OUT chroma level adj.
27	65	65	
28 to 3B	Fixed data-1 (Initialized data)		
3C	Fixed data-2		
3D, 3E	Fixed data-1 (Initialized data)		
3F	6C	6C	EVF automatic adj. (VCO adj.)
40	90	90	
41 to 44	Fixed data-1 (Initialized data)		
45	Fixed data-2		
46			
47	28	28	EVF automatic adj. (Contrast adj.)
48 to 4C	Fixed data-1 (Initialized data)		
4D	Fixed data-2		
4E			
4F			
50	6C	6C	LCD automatic adj. (VCO adj.)
51	90	90	
52	BC	BC	V-COM adj. (LCD)
53, 54	Fixed data-1 (Initialized data)		
55	Fixed data-2		
56	7D	7D	Transmissive mode white balans adj. (LCD)
57	73	73	
58	52	52	LCD automatic adj. (Contrast adj.)
59 to 5E	Fixed data-1 (Initialized data)		
5F	Fixed data-2		
60 to 65	Fixed data-1 (Initialized data)		
66	Fixed data-2		
67			
68			
69 to 74	Fixed data-1 (Initialized data)		
75	Fixed data-2		
76 to A8	Fixed data-1 (Initialized data)		
A9	Fixed data-2		

C Page Table

Address	Initial value		Remark
	NTSC	PAL	
AA			Fixed data-1 (Initialized data)
AB			Fixed data-2
AC			
AD to AF			Fixed data-1 (Initialized data)
B0			Fixed data-2
B1			
B2			
B3			Fixed data-1 (Initialized data)
B4			Fixed data-2
B5			
B6 to D1			Fixed data-1 (Initialized data)
D2			Fixed data-2
D3			
D4			
D5 to DD			Fixed data-1 (Initialized data)
DE			Fixed data-2
DF			
E0 to E4			Fixed data-1 (Initialized data)
E5	00	00	Node unique ID No. Input
E6	00	00	
E7	00	00	
E8 to F3			Fixed data-1 (Initialized data)
F4	00	00	Emergency memory address (Mechanism section)
F5	00	00	
F6	00	00	
F7	00	00	
F8	00	00	
F9	00	00	
FA	00	00	
FB	00	00	
FC	00	00	
FD	00	00	
FE	00	00	
FF	00	00	

5. 1C Page Table

Note 1: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to B2			Fixed data-1 (Initialized data)
B3	00	00	SD error rate check (LP)
B4	00	00	
B5	00	00	
B6	00	00	
B7	00	00	
B8	80	80	
B9	00	00	
BA	00	00	
BC	00	00	
BD	00	00	
BE	00	00	
BF	00	00	
C0	00	00	
C1	00	00	
C2	00	00	
C3	80	80	
C4	00	00	
C5	00	00	
C6	00	00	
C7	00	00	
C8	00	00	
C9 to E5			Fixed data-1 (Initialized data)
E6			Fixed data-2
E7 to E9			Fixed data-1 (Initialized data)
EA			Fixed data-2
EB			
EC to EE			Fixed data-1 (Initialized data)
EF			Fixed data-2
F0			
F1 to FF			Fixed data-1 (Initialized data)

1-2-3. Initialization of E, F, 1F Page Data

Note: Check that the data of page: 0, address: 10 is "00".

1. Initializing of E, F, 1F Page Data

Note 1: If "Initialization of Pages E, F, 1F" is executed, all data on pages E, F, 1F are initialized. (Only an individual page cannot be initialized)

Note 2: If the E, F, 1F page data has been initialized, the following adjustments need to be performed again.
1) Modification of E, F, 1F page data
2) Camera system adjustments

Note 3: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Adjustment Page	E
Adjustment Address	00 to FF
Adjustment Page	F
Adjustment Address	10 to FF
Adjustment Page	1F
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	6	01		Set the following data, and press PAUSE button. 2D: NTSC model 2F: PAL model
4	6	03	FF	Press PAUSE button.
5	6	02		Check the data changes to "01".
6	6	01	00	Press PAUSE button.
7				Perform "Modification of E, F, 1F Page Data"

2. Modification of E, F, 1F Page Data

If the E, F, 1F page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages E, F, set data: 00 to page: 0, address: 10, and then select pages E, F.
3) If modification of data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages F. After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after completing modification E, F, 1F page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.
4				Perform "36MHz Origin Oscillation Adjustment" of CAMERA SYSTEM ADJUSTMENTS.

3. E Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the E, F, 1F Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of E, F, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 11			Fixed data-1 (Initialized data)
12			Fixed data-2
13, 14			Fixed data-1 (Initialized data)
15			Fixed data-2
16			
17			
18 to 34			Fixed data-1 (Initialized data)
35			Fixed data-2
36 to 41			Fixed data-1 (Initialized data)
42			Fixed data-2
43			
44			
45			
46			
47			
48			
49			
4A			
4B			Fixed data-1 (Initialized data)
4C			Fixed data-2
4D to 55			Fixed data-1 (Initialized data)
56			Fixed data-2
57			
58 to 68			Fixed data-1 (Initialized data)
69			Fixed data-2
6A to 8D			Fixed data-1 (Initialized data)
8E			Fixed data-2
8F			
90			Fixed data-1 (Initialized data)
91			Fixed data-2
92 to A3			Fixed data-1 (Initialized data)
A4			Fixed data-2
A5 to BD			Fixed data-1 (Initialized data)
BE			Fixed data-2
BF to DA			Fixed data-1 (Initialized data)
DB			Fixed data-2
DC to E4			Fixed data-1 (Initialized data)
E5			Fixed data-2
E6 to FF			Fixed data-1 (Initialized data)

4. F Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the E, F, 1F Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of E, F, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	80	80	36MHz origin osillation adj.
11			Fixed data-1 (Initialized data)
12	50	50	Hall adj.
13	50	50	
14	89	89	
15	00	00	
16	17	17	
17	00	00	
18	00	00	
19	A8	A8	MAX GAIN adj.
1A	36	36	LV standard data input
1B	00	00	
1C	00	00	F No. standard data input
1D	00	00	
1E	00	00	
1F	00	00	
20	00	00	
21	00	00	
22	00	00	
23	00	00	
24 to 29			Fixed data-1 (Initialized data)
2A	27	27	Auto white balance standard data input
2B	00	00	
2C	08	08	
2D	00	00	
2E	18	18	Auto white balance adj.
2F	00	00	
30	0E	0E	
31	00	00	
32			Fixed data-1 (Initialized data)
33	48	47	Color reproduction adj.
34			Fixed data-1 (Initialized data)
35	2A	2B	Color reproduction adj.
36 to 39			Fixed data-1 (Initialized data)
3A	00	FF	Color reproduction adj.
3B	EF	ED	
3C, 3D			Fixed data-1 (Initialized data)
3E	2A	2A	Auto white balance adj.
3F	00	C0	
40	5D	5C	
41	00	00	
42, 43			Fixed data-1 (Initialized data)

F Page Table

Address	Initial value		Remark
	NTSC	PAL	
44	3A	3A	Flange back adj.
45	74	74	
46	3F	3F	
47	2C	2C	
48	17	17	
49	4A	4A	
4A	00	00	
4B	00	00	
4C	00	00	
4D	00	00	
4E	4F	4F	
4F	19	19	
50	00	00	
51	30	30	
52	04	04	
53	00	00	
54	00	00	
55 to 57			Fixed data-1 (Initialized data)
58			Fixed data-2
59			
5A	FF	FF	Optical axis adj.
5B to 67			Fixed data-1 (Initialized data)
68	00	00	Mechanical shutter adj.
69	00	00	
6A	00	00	
6B	00	00	
6C	00	00	
6D	00	00	
6E	00	00	
6F	00	00	
70	00	00	
71	00	00	
72	00	00	
73	00	00	
74	00	00	
75	00	00	
76	00	00	
77	00	00	
78	00	00	
79	00	00	
7A	00	00	
7B	00	00	
7C	00	00	
7D	00	00	

Address	Initial value		Remark
	NTSC	PAL	
7E to 8B			Fixed data-1 (Initialized data)
8C			Fixed data-2
8D			
8E			
8F			
90			
91, 92			Fixed data-1 (Initialized data)
93			Fixed data-2
94			
95			
96			
97, 98			Fixed data-1 (Initialized data)
99			Fixed data-2
9A to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD			
AE			
AF			
B0			
B1 to EA			Fixed data-1 (Initialized data)
EB			Fixed data-2
EC, ED			Fixed data-1 (Initialized data)
EE			Fixed data-2
EF to FA			Fixed data-1 (Initialized data)
FB			Fixed data-2
FC to FF			Fixed data-1 (Initialized data)

5. 1F Page Table

Note 1: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the E, F, 1F Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of E, F, 1F Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to 07			Fixed data-1 (Initialized data)
08			Fixed data-2
09 to 59			Fixed data-1 (Initialized data)
5A	00	00	Emergency memory address (Camera section)
5B	00	00	
5C	00	00	
5D	00	00	
5E to FF			Fixed data-1 (Initialized data)

1-3. INITIALIZATION OF 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F PAGE DATA (MS model)

Note 1: If reading/writing data on pages 18, 19, 1A, 1B, 1C, 1E, 1F, set data: 01 to page: 0, address: 10, and then select pages: 8, 9, A, B, C, E, F.
By this data setting, the pages 18, 19, 1A, 1B, 1C, 1E, 1F, can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: MS model: DCR-HC32/HC32E/HC33/HC33E

1-3-1. Initialization of A, B, D, 1A, 1B Page Data

Note: Check that the data of page: 0, address: 10 is "00".

1. Initializing of A, B, D, 1A, 1B Page Data

Note 1: If the A, B, D, 1A, 1B page data has been initialized, the following adjustments need to be performed again.
1) Modification of A, B, D, 1A, 1B page data
2) Touch panel adjustment

Note 2: NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Adjustment Page	A
Adjustment Address	10 to FF
Adjustment Page	B
Adjustment Address	00 to FF
Adjustment Page	D
Adjustment Address	10 to 70
Adjustment Page	1A
Adjustment Address	00 to FF
Adjustment Page	1B
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	7	04		Set the following data 20: NTSC model 21: PAL model
4	7	01		Set the following data 20: Initializing A page 21: Initializing B page 22: Initializing D page 23: Initializing 1A page 24: Initializing 1B page 25: Initializing A and 1A page 26: Initializing B and 1B page 28: Initializing A, B, D, 1A and 1B page
5	7	00	01	Press PAUSE button.
6	7	02		Check the data changes to "01".
7				Perform "Modification of A, B, D, 1A, 1B Page Data"

2. Modification of A, B, D, 1A, 1B Page Data

If the A, B, D, 1A, 1B page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages A, B, D, set data: 00 to page: 0, address: 10, and then select pages A, B, D.
3) If modification of data on pages 1A, 1B, set data: 01 to page: 0, address: 10, and then select pages A, B.
After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
Note 1: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after Completing Modification A, B, D, 1A, 1B page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.

Note 2: If following symptoms occur after completing of the "Modification A, B, D, 1A, 1B page data", check that the data of the "Fixed data-2" address of A, B, D, 1A, 1B page are same as those of same model of same destination.
1) The power is shut off so that unit cannot operate.

3. A Page table

Note 1: Check that the data of page: 0, address: 10 is“00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the A, B, D, 1A, 1B Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of A, B, D, 1A, 1B Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	00	00	Test mode
11 to 17			Fixed data-1 (Initialized data)
18			Fixed data-2
19 to 2E			Fixed data-1 (Initialized data)
2F			Fixed data-2
30			Fixed data-1 (Initialized data)
31			Fixed data-2
32 to 60			Fixed data-1 (Initialized data)
61			Fixed data-2
62			
63			
64 to 8F			Fixed data-1 (Initialized data)
90	E0	DD	Touch panel adj
91	1D	1C	
92	D4	C7	
93	24	2A	
94 to CF			Fixed data-1 (Initialized data)
D0			Fixed data-2
D1			
D2			
D3, D4			Fixed data-1 (Initialized data)
D5			Fixed data-2
D6			Fixed data-1 (Initialized data)
D7			Fixed data-2
D8			Fixed data-1 (Initialized data)
D9			Fixed data-2
DA to F0			Fixed data-1 (Initialized data)
F1			Fixed data-2
F2			
F3			
F4 to FF			Fixed data-1 (Initialized data)

4. B Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, B, D, 1A, 1B Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, B, D, 1A, 1B Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to FF			Fixed data-1 (Initialized data)

5. D Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, B, D, 1A, 1B Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, B, D, 1A, 1B Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10 to 13			Fixed data-1 (Initialized data)
14			Fixed data-2
15			Fixed data-1 (Initialized data)
16			Fixed data-2
17			
18 to 27			Fixed data-1 (Initialized data)
28			Fixed data-2
29			
2A			
2B			
2C			
2D			Fixed data-1 (Initialized data)
2E			Fixed data-2
2F			
30			
31, 32			Fixed data-1 (Initialized data)
33			Fixed data-2
34 to 44			Fixed data-1 (Initialized data)
45			Fixed data-2
46, 47			Fixed data-1 (Initialized data)
48			Fixed data-2
49			Fixed data-1 (Initialized data)
4A			Fixed data-2
4B			
4C			Fixed data-1 (Initialized data)
4D			Fixed data-2
4E			
4F to 56			Fixed data-1 (Initialized data)
57			Fixed data-2
58 to 70			Fixed data-1 (Initialized data)

6. 1A Page table

Note 1: If reading/writing data on pages 1A, set data: 01 to page: 0, address: 10, and then select pages: A. By this data setting, the pages 1A can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the A, B, D, 1A, 1B Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of A, B, D, 1A, 1B Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to FF	Fixed data-1 (Initialized data)		

7. 1B Page table

Note 1: If reading/writing data on pages 1B, set data: 01 to page: 0, address: 10, and then select pages: B. By this data setting, the pages 1B can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the A, B, D, 1A, 1B Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of A, B, D, 1A, 1B Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to FF	Fixed data-1 (Initialized data)		

1-3-2. Initialization of 8, C, 18, 1C Page Data

1. Initializing of 8, C, 18, 1C Page Data

Note1: If "Initialization of Pages 8, C, 18, 1C" is executed, all data on pages 8, C, 18, 1C are initialized. (Only an individual page cannot be initialized)

Note2 : If the 8, C, 18, 1C page data has been initialized, the following adjustments need to be performed again.
1) Modification of 8, C, 18, 1C page data
2) Electronic viewfinder system adjustments (if all areas were initialized)
3) LCD system adjustments (if all areas were initialized)
4) Node unique ID No. input (if all areas were initialized)
5) Servo, RF system adjustments (if all areas were initialized)
6) Video system adjustments (if all areas were initialized)

Adjustment Page	8
Adjustment Address	00 to FF
Adjustment Page	C
Adjustment Address	10 to FF
Adjustment Page	18
Adjustment Address	00 to FF
Adjustment Page	1C
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	3	81		Check the data is "00".
4	3	80	0C	Press PAUSE button.
5	3	80		Check the data changes to "1C".
6				Perform "Modification of 8, C, 18, 1C Page Data"

Note 3: If other than adjustment address was initialized, the adjusted data is not initialized.

2. Modification of 8, C, 18, 1C Page Data

If the 8, C, 18, 1C page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages 8, C, set data: 00 to page: 0, address: 10, and then select pages 8, C.
3) If modification of data on pages 18, 1C, set data: 01 to page: 0, address: 10, and then select pages 8, C.
   After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) If all areas were initialized, check that the data at the addresses for adjustment are initial values (adjustment initial values) listed in the table.
   If different, change them to the adjustment initial values.

Processing after Completing Modification 8, C, 18, 1C page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.

3. 8 Page table

Note 1: Check that the data of page: 0, address: 10 is“00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 18, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 18, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 29			Fixed data-1 (Initialized data)
2A			Fixed data-2
2B to 3F			Fixed data-1 (Initialized data)
40			Fixed data-2
41 to 4C			Fixed data-1 (Initialized data)
4D			Fixed data-2
4E to 79			Fixed data-1 (Initialized data)
7A			Fixed data-2
7B			
7C to 83			Fixed data-1 (Initialized data)
84			Fixed data-2
85			
86			
87			
88			
89			
8A to 8D			Fixed data-1 (Initialized data)
8E			Fixed data-2
8F			
90 to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA, AB			Fixed data-1 (Initialized data)
AC			Fixed data-2
AD to B1			Fixed data-1 (Initialized data)
B2			Fixed data-2
B3			
B4			
B5			Fixed data-1 (Initialized data)
B6			Fixed data-2
B7			Fixed data-1 (Initialized data)
B8			Fixed data-2
B9			
BA			
BB			
BC, BD			Fixed data-1 (Initialized data)
BE			Fixed data-2
BF			
C0 to C2			Fixed data-1 (Initialized data)
C3			Fixed data-2
C4			
C5			
C6			Fixed data-1 (Initialized data)
C7			Fixed data-2
C8			
C9			
CA			
CB			
CC			
CD			
CE to D5			Fixed data-1 (Initialized data)
D6			Fixed data-2
D7			
D8 to DF			Fixed data-1 (Initialized data)
E0			Fixed data-2
E1			Fixed data-1 (Initialized data)
E2			Fixed data-2
E3			
E4			
E5			
E6			
E7			
E8 to EF			Fixed data-1 (Initialized data)
F0			Fixed data-2
F1 to F9			Fixed data-1 (Initialized data)
FA			Fixed data-2
FB			
FC to FF			Fixed data-1 (Initialized data)

4. C Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 18, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 18, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	EE	EE	Switching position adj.
11	00	00	
12	00	00	
13	00	00	
14, 15			Fixed data-1 (Initialized data)
16	E0	E0	CAP FG duty adj.
17 to 24			Fixed data-1 (Initialized data)
25	80	80	S VIDEO OUT Y level adj.
26	54	54	S VIDEO OUT chroma level adj.
27	3D	3D	
28 to 3B			Fixed data-1 (Initialized data)
3C			Fixed data-2
3D			
3E			
3F	A0	A0	EVF automatic adj. (VCO adj.)
40	B0	B0	
41			Fixed data-1 (Initialized data)
42			Fixed data-2
43			Fixed data-1 (Initialized data)
44			Fixed data-2
45			
46			
47	28	28	EVF automatic adj. (Contrast adj.)
48			Fixed data-2
49			
4A, 4B			Fixed data-1 (Initialized data)
4C			Fixed data-2
4D			
4E			
4F			
50	A0	A0	LCD automatic adj. (VCO adj.)
51	B0	B0	
52	BC	BC	V-COM adj. (LCD)
53, 54			Fixed data-1 (Initialized data)
55			Fixed data-2
56	88	88	Transmissive mode white balans adj. (LCD)
57	71	71	
58	50	50	LCD automatic adj. (Contrast adj.)
59			Fixed data-2
5A to 5E			Fixed data-1 (Initialized data)
5F			Fixed data-2

Address	Initial value		Remark
	NTSC	PAL	
60, 61			Fixed data-1 (Initialized data)
62			Fixed data-2
63			
64, 65			Fixed data-1 (Initialized data)
66			Fixed data-2
67			
68			
69, 6A			Fixed data-1 (Initialized data)
6B			Fixed data-2
6C to 74			Fixed data-1 (Initialized data)
75			Fixed data-2
76 to 78			Fixed data-1 (Initialized data)
79			Fixed data-2
7A			
7B			
7C			
7D			Fixed data-1 (Initialized data)
7E			Fixed data-2
7F to A0			Fixed data-1 (Initialized data)
A1			Fixed data-2
A2			
A3			
A4			
A5 to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD to B1			Fixed data-1 (Initialized data)
B2			Fixed data-2
B3			
B4			
B5			
B6 to CB			Fixed data-1 (Initialized data)
CC			Fixed data-2
CD			
CE			
CF			
D0			
D1			
D2			
D3			
D4			
D5 to DD			Fixed data-1 (Initialized data)
DE			Fixed data-2
DF			

C Page table

Address	Initial value		Remark
	NTSC	PAL	
E0 to E4			Fixed data-1 (Initialized data)
E5	00	00	Node unique ID No. Inputs
E6	00	00	
E7	00	00	
E8 to F3			Fixed data-1 (Initialized data)
F4	00	00	Emergency memory address (Mechanism section)
F5	00	00	
F6	00	00	
F7	00	00	
F8	00	00	
F9	00	00	
FA	00	00	
FB	00	00	
FC	00	00	
FD	00	00	
FE	00	00	
FF	00	00	

5. 18 Page table

Note 1: If reading/writing data on pages 18, set data: 01 to page: 0, address: 10, and then select pages: 8. By this data setting, the pages 18 can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to“00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 18, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 18, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00			Fixed data-1 (Initialized data)
01			Fixed data-2
02 to FF			Fixed data-1 (Initialized data)

6. 1C Page table

Note 1: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages: C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to"00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the 8, C, 18, 1C Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of 8, C, 18, 1C Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to B2			Fixed data-1 (Initialized data)
B3	00	00	SD error rate check (LP)
B4	00	00	
B5	00	00	
B6	00	00	
B7	00	00	
B8	80	80	
B9	00	00	
BA	00	00	
BB	00	00	
BC	00	00	
BD	00	00	
BE	00	00	
BF	00	00	
C0	00	00	
C1	00	00	
C2	00	00	
C3	80	80	
C4	00	00	
C5	00	00	
C6	00	00	
C7	00	00	
C8	00	00	
C9 to E5			Fixed data-1 (Initialized data)
E6			Fixed data-2
E7			Fixed data-1 (Initialized data)
E8	00	00	When IC5301 is Type A. (This data vary according to the type of the IC5301 of VC-37 board.) (Note 3)
	1E	1E	When IC5301 is Type B. (This data vary according to the type of the IC5301 of VC-377 board.) (Note 3)
E9			Fixed data-1 (Initialized data)
EA			Fixed data-2
EB			
EC to EE			Fixed data-1 (Initialized data)
EF			Fixed data-2
F0			
F1 to F7			Fixed data-1 (Initialized data)
F8	00	00	When IC5301 is Type A. (This data vary according to the type of the IC5301 of VC-377 board.) (Note 3)
	60	60	When IC5301 is Type B. (This data vary according to the type of the IC5301 of VC-377 board.) (Note 3)
F9 to FF			Fixed data-1 (Initialized data)

Note 3: By checking the data of page: 6, address: FF, the type of IC5301 of VC-377 board can be discriminated.

Order	Page	Address	Data	Procedure
1	0	10	00	
2	6	FF		Check the data. 01: Type A 02 or more: Type B

1-3-3. Initialization of E, F, 19, 1E, 1F Page Data

1. Initializing of E, F, 19, 1E, 1F Page Data

Note 1: If "Initialization of Pages E, F, 19, 1E, 1F" is executed, all data on pages E, F, 19, 1E, 1F are initialized. (Only an individual page cannot be initialized)

Note 2: If the E, F, 19, 1E, 1F page data has been initialized, the following adjustments need to be performed again.
1) Modification of E, F, 19, 1E, 1F page data
2) Camera system adjustment (if all areas were initialized)

Note 3: NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Adjustment Page	E
Adjustment Address	00 to FF
Adjustment Page	F
Adjustment Address	10 to FF
Adjustment Page	19
Adjustment Address	00 to 33
Adjustment Page	1E
Adjustment Address	00 to FF
Adjustment Page	1F
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	6	01		Set the following data 2D: NTSC model 2F: PAL model
4	6	03	FF	Press PAUSE button.
5	6	02		Check the data changes to "01".
6	6	01	00	Press PAUSE button.
7				Perform "Modification of E, F, 19, 1E, 1F Page Data"

2. Modification of E, F, 19, 1E, 1F Page Data

If the E, F, 19, 1E, 1F page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages E, F, set data: 00 to page: 0, address: 10, and then select pages E, F.
3) If modification of data on pages 19, 1E, 1F, set data: 01 to page: 0, address: 10, and then select pages 9, E, F.
   After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) If all areas were initialized, check that the data at the addresses for adjustment are initial values (adjustment initial values) listed in the table.
   If different, change them to the adjustment initial values.

Processing after Completing Modification E, F, 19, 1E, 1F page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.
4				Perform "36MHz Origin Oscillation Adjustment" of CAMERA SYSTEM ADJUSTMENTS.

3. E Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 07			Fixed data-1 (Initialized data)
08			Fixed data-2
09			
0A to 11			Fixed data-1 (Initialized data)
12			Fixed data-2
13, 14			Fixed data-1 (Initialized data)
15			Fixed data-2
16			
17			
18 to 34			Fixed data-1 (Initialized data)
35			Fixed data-2
36 to 68			Fixed data-1 (Initialized data)
69			Fixed data-2
6A to 8D			Fixed data-1 (Initialized data)
8E			Fixed data-2
8F			
90			Fixed data-1 (Initialized data)
91			Fixed data-2
92 to A3			Fixed data-1 (Initialized data)
A4			Fixed data-2
A5 to AA			Fixed data-1 (Initialized data)
AB			Fixed data-2
AC to AF			Fixed data-1 (Initialized data)
B0			Fixed data-2
B1			Fixed data-1 (Initialized data)
B2			Fixed data-2
B3			
B4 to BD			Fixed data-1 (Initialized data)
BE			Fixed data-2
BF to E2			Fixed data-1 (Initialized data)
E3			Fixed data-2
E4			
E5			
E6 to FF			Fixed data-1 (Initialized data)

4. F Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	80	80	36MHz origin osillation adj.
11			Fixed data-1 (Initialized data)
12	50	50	Hall adj.
13	50	50	
14	89	89	
15	00	00	
16	17	17	
17	00	00	
18	19	19	
19	9A	9A	MAX GAIN adj.
1A	36	36	LV standard data input
1B	00	00	
1C	00	00	F No. standard data input
1D	00	00	
1E	00	00	
1F	00	00	
20	00	00	
21	00	00	
22	00	00	
23	00	00	
24 to 29			Fixed data-1 (Initialized data)
2A	1B	1B	Auto white balance standard data input
2B	00	00	
2C	07	07	
2D	00	00	
2E	0E	0E	Auto white balance adj.
2F	00	00	
30	0D	0D	
31	00	00	
32			Fixed data-1 (Initialized data)
33	22	22	Color reproduction adj.
34			Fixed data-1 (Initialized data)
35	27	24	Color reproduction adj.
36 to 39			Fixed data-1 (Initialized data)
3A	00	00	Color reproduction adj.
3B	F1	EF	
3C, 3D			Fixed data-1 (Initialized data)
3E	2C	2C	Auto white balance adj.
3F	B0	B0	
40	5F	5F	
41	A0	A0	
42, 43			Fixed data-1 (Initialized data)

F Page table

Address	Initial value		Remark
	NTSC	PAL	
44	3A	3A	Flange back adj.
45	74	74	
46	3F	3F	
47	2C	2C	
48	17	17	
49	4A	4A	
4A	00	00	
4B	00	00	
4C	00	00	
4D	00	00	
4E	4F	4F	
4F	19	19	
50	00	00	
51	30	30	
52	04	04	
53	00	00	
54	00	00	
55	00	00	
56 to 63			Fixed data-1 (Initialized data)
64			Fixed data-2
65			
66	FF	FF	Optical axis adj.
67			Fixed data-1 (Initialized data)
68	80	80	Mechanical shutter adj.
69	80	80	
6A	80	80	
6B	80	80	
6C	80	80	
6D	80	80	
6E	40	40	
6F	00	00	
70	34	34	
71	00	00	
72	30	30	
73	00	00	
74	2A	2A	
75	00	00	
76	14	14	
77	00	00	
78	70	70	
79	80	80	
7A	80	80	
7B	80	80	
7C	80	80	
7D	1E	1E	

Address	Initial value		Remark
	NTSC	PAL	
7E to 8B			Fixed data-1 (Initialized data)
8C			Fixed data-2
8D			
8E			
8F			
90			
91, 92			Fixed data-1 (Initialized data)
93			Fixed data-2
94			
95			
96			
97			
98			Fixed data-1 (Initialized data)
99			Fixed data-2
9A to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD			
AE			
AF			
B0			
B1 to E4			Fixed data-1 (Initialized data)
E5			Fixed data-2
E6 to EA			Fixed data-1 (Initialized data)
EB			Fixed data-2
EC, ED			Fixed data-1 (Initialized data)
EE			Fixed data-2
EF			
F0			
F1			
F2			
F3			
F4			
F5			Fixed data-1 (Initialized data)
F6			Fixed data-2
F7			
F8			
F9			
FA			
FB			
FC			
FD			
FE			
FF			

5. 19 Page table

Note 1: If reading/writing data on pages 19, set data: 01 to page: 0, address: 10, and then select pages: 9. By this data setting, the pages 19 can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 33	Fixed data-1 (Initialized data)		

6. 1E Page table

Note 1: If reading/writing data on pages 1E, set data: 01 to page: 0, address: 10, and then select pages: E. By this data setting, the pages 1E can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to FF	Fixed data-1 (Initialized data)		

7. 1F Page table

Note 1: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages: F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. ("Refer to 1. Initializing the E, F, 19, 1E, 1F Page Data")
Fixed data-2: Modified data. ("Refer to 2. Modification of E, F, 19, 1E, 1F Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to 07			Fixed data-1 (Initialized data)
08			Fixed data-2
09 to 1B			Fixed data-1 (Initialized data)
1C	00	00	Emergency memory address (Camera section)
1D	00	00	
1E	00	00	
1F	00	00	
20 to 29			Fixed data-1 (Initialized data)
2A			Fixed data-2
2B			
2C			Fixed data-1 (Initialized data)
2D			Fixed data-2
2E			
2F to 6B			Fixed data-1 (Initialized data)
6C			Fixed data-2
6D			Fixed data-1 (Initialized data)
6E			Fixed data-2
6F to 84			Fixed data-1 (Initialized data)
85			Fixed data-2
86			
87			
88 to 8A			Fixed data-1 (Initialized data)
8B			Fixed data-2
8C to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD			
AE			
AF			
B0			
B1			
B2			Fixed data-1 (Initialized data)
B3			Fixed data-2
B4 to FF			Fixed data-1 (Initialized data)

1-4. CAMERA SYSTEM ADJUSTMENTS

Before perform the camera system adjustments, check that the specified values of "VIDEO SYSTEM ADJUSTMENTS" are satisfied. (Except "36MHz Origin Oscillation Adjustment")
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

1. 36MHz Origin Oscillation Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

Set the frequency of the clock for synchronization.
If deviated, the synchronization will be disrupted and the color will become inconsistent.

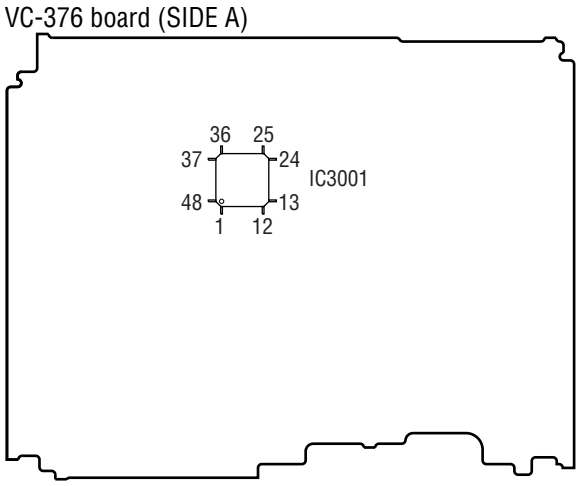
Subject	Not required
Measurement Point	Pin ⑫ of IC3001 (Non MS model) Pin ⑫ of IC3101 (MS model)
Measuring Instrument	Frequency counter
Adjustment Page	F
Adjustment Address	10
Specified value	f = 18000000 ± 90 Hz

Note 1: Check that the data of page: 0, address: 10 is "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	F	10		Change the data and set the frequency (f) to the specified value.
3	F	10		Press PAUSE button.
4	0	01	00	

Non MS model



MS model

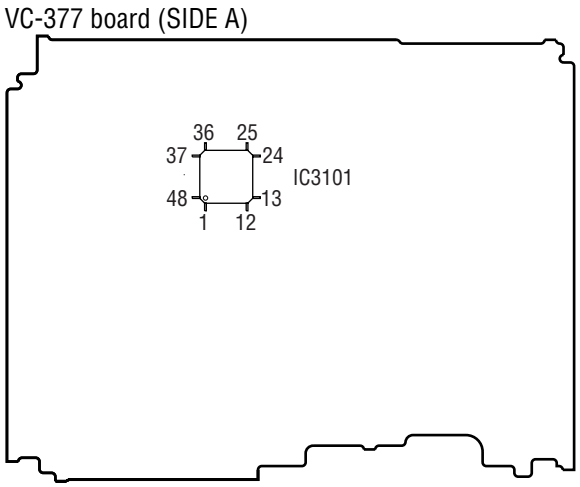


Fig. 6-1-8

2. HALL Adjustment RadarW

For detecting the position of lens iris, adjust the hall AMP gain and offset.

Subject	Not required
Measurement Point	Displayed data of page: 1 (Note 3)
Measuring Instrument	Adjusting remote commander
Adjustment Page	F
Adjustment Address	12 to 18
Specified value	Non MS model: 87 to 8B during IRIS OPEN 15 to 19 during IRIS CLOSE MS model: 15 to 19 during IRIS OPEN 87 to 8B during IRIS CLOSE

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 3: The right two digits of the page: 1 displayed data of the adjusting remote commander.

1:00:XX
└Displayed data

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	D0	40	Non MS model only. (Note 4)
3	6	01	6D	Press PAUSE button. (Note 5)
4	6	02		Check the data changes to "01".

Note 5: The adjustment data will be automatically input to page: F, address: 12 to 18.

Checking method:

Order	Page	Address	Data	Procedure
1	0	03	03	
2	6	01	01	Press PAUSE button.
3	1			Check that the displayed data (Note 3) during IRIS OPEN satisfied the specified value.
4	6	01	03	Press PAUSE button.
5	1			Check that the displayed data (Note 3) during IRIS CLOSE satisfied the specified value.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	0	03	00	
3	0	01	00	

3. Flange Back Adjustment RadarW
(Using the minipattern box or flange back adjustment jig)

The inner focus lens flange back adjustment is carried out automatically. In whichever case, the focus will be deviated during auto focusing/manual focusing.

Subject	Siemens star chart with ND filter for minipattern box (Note 1) or flange back adjustment jig
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 44 to 54 MS model: 44 to 55
Specified value	Data of page: 6, address: 0C is "00"

Note 1: Dark Siemens star chart.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: Perform the adjustment with the camcorder in horizontal state.
Note 5: Perform "HALL Adjustment" before this adjustment.
Note 6: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) COLOR SLOW S (Menu setting) ..... OFF (MS model)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	01	
3	6	01	13	Press PAUSE button.
4	6	01	27	Press PAUSE button. (Note 7)
5	6	02		Check the data changes to "01".
6	6	0C		Check the data is "00".

Note 7: The adjustment data will be automatically input to page: F, address: 44 to 54 (Non MS model)/44 to 55 (MS model).

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	01	25	Press PAUSE button.
3	6	01	00	Press PAUSE button.
4	6	48	00	
5	0	01	00	
6				Perform "Flange Back Check".

Preparations (Using the minipattern box)

1) The minipattern box is installed as shown in the following figure.
Note 8: The attachment lenses are not used.
2) Install the minipattern box so that the distance between it and the front of lens of camcorder is less than 3 cm.
3) Make the height of minipattern box and the camera equal.
4) Check the output voltage of the regulated power supply is the specified voltage ± 0.01 Vdc.
5) Check that the center of Siemens star chart meets the center of shot image screen with the zoom lens at TELE end and WIDE end respectively.

Specified voltage: The specified voltage varies according to the minipattern box, so adjust the power supply output voltage to the specified voltage written on the sheet which is supplied with the minipattern box.

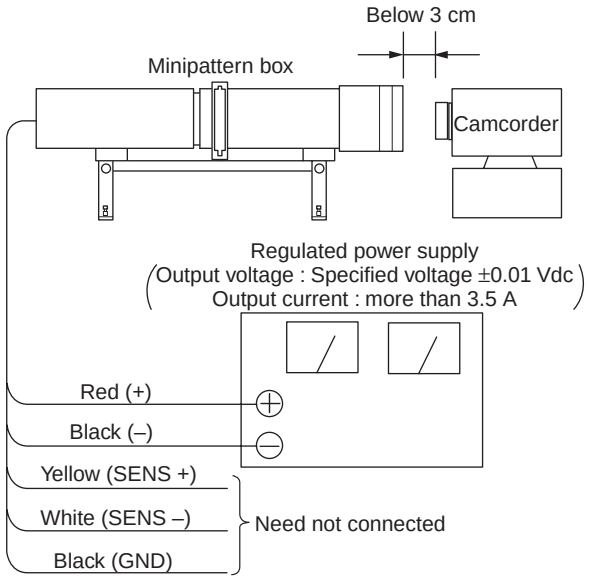


Fig. 6-1-9

PPreparation (Using the flange back adjustment jig) (Luminance: about 300 lux)

1) Install the flange back adjustment jig so that the distance between it and the front of lens of camera is less than 3 cm.
2) Make the height of flange back adjustment jig and the camera equal.
3) Check that the center of chart meets the center of shot image screen with the zoom lens at TELE end and WIDE end respectively.

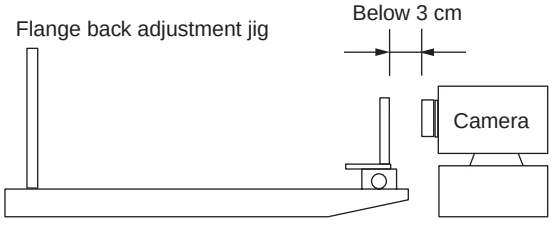


Fig. 6-1-10

4. Flange Back Adjustment (Using the flange back adjustment chart and subject more than 500 m away)

The inner focus lens flange back adjustment is carried out automatically. In whichever case, the focus will be deviated during auto focusing/manual focusing.

4-1. Flange Back Adjustment (1) RadarW

Subject	Flange back adjustment chart (2.0 m from the front of lens) (Luminance: 300 to 400 lux)
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 44 to 54 MS model: 44 to 55
Specified value	Data of page: 6, address: 0C is “00”

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Check that the data of page: 6, address: 02 is “00”. If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 3: Perform the adjustment with the camcorder in horizontal state.

Note 4: Perform “HALL Adjustment” before this adjustment.

Note 5: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) COLOR SLOW S (Menu setting) ..... OFF (MS model)

Preparations before adjustments:

1) Place the Flange back adjustment chart 2.0 m from the front of the lens.
2) Check that the center of Flange back adjustment chart meets the center of shot image screen with the zoom lens at TELE end and WIDE end respectively.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	01	
3	6	01	13	Press PAUSE button.
4	6	01	15	Press PAUSE button. (Note 6)
5	6	02		Check the data changes to “01”.
6	6	0C		Check the data is “00”.

Note 6: The adjustment data will be automatically input to page: F, address: 44 to 54 (Non MS model)/44 to 55 (MS model).

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	01	25	Press PAUSE button.
3	6	01	00	Press PAUSE button.
4	6	48	00	
5	0	01	00	
6				Perform “Flange Back Adjustment (2)”.

4-2. Flange Back Adjustment (2) RadarW

Perform this adjustment after performing "Flange Back Adjustment (1)".

Subject	Subject more than 500 m away (Subject with clear contrast such as buildings, etc.)
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 44 to 54 MS model: 44 to 55
Specified value	Data of page: 6, address: 0C is "00"

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) COLOR SLOW S (Menu setting) ..... OFF (MS model)

Preparations before adjustments:

1) Set the zoom lens to the TELE end and expose a subject that is more than 500 m away.
(subjects with clear contrast such as building, etc.)
(Nearby subjects less than 500 m away should not be in the screen)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	01	
3	6	01	13	Press PAUSE button.
4				Place ND filter on the lens so that the optimum image is obtain.
5	6	01	29	Press PAUSE button. (Note 4)
6	6	02		Check the data changes to "01".
7	6	0C		Check the data is "00".

Note 4: The adjustment data will be automatically input to page: F, address: 44 to 54 (Non MS model)/44 to 55 (MS model).

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	01	25	Press PAUSE button.
3	6	01	00	Press PAUSE button.
4	6	48	00	
5	0	01	00	
6				Perform "Flange Back Check".

5. Flange Back Check

Subject	Siemens star (2.0 m from the front of the lens) (Luminance: approx. 200 lux)
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Specified value	Focused at the TELE end and WIDE end

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF

Note 3: When the auto focus is ON, the lens can be checked if it is focused or not by observing the data on the page: 1 of the adjusting remote commander.

1 : 00 : XX
- Odd: Focused
- Even: Unfocused

Checking method:

Order	Page	Address	Data	Procedure
1				Place the Siemens star 2.0 m from the front of the lens.
2				To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appear on the image.
3	6	40	01	
4	6	41	01	
5				Shoot the Siemens star with the zoom TELE end.
6				Turn on the auto focus.
7	0	03	0F	
8	1			Check that the lens is focused. (Note 3)
9	6	21	10	
10				Shoot the Siemens star with the zoom WIDE end.
11				Observe the TV monitor and check that the lens is focused.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	21	00	
2	6	40	00	
3	6	41	00	
4	0	03	00	

6. Optical Axis Adjustment

Correct a deviation of optical axis between the lens and the CCD imager.

If deviated, the screen center will be shifted when the lens is zoomed from TELE end to WIDE end.

Subject	Siemens Star
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 5A MS model: 66

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: "Flange Back Adjustment" must be already finished.

Note 3: Check that the data of page: 6, address: 48 is "00". If not, set data: 00 to this address.

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) DIGITAL ZOOM (Menu setting) ..... OFF
3) STEADYSHOT (Menu setting) ..... OFF

Preparation for adjustment:

1) Play a monoscope portion of the System Check tape (XH5-5 (NTSC) or XH5-5P (PAL)).
2) Stick the optical axis deviation specification frame to the monitor screen so that the center of monoscope coincides with the center of specification frame.
3) Select the CAMERA mode (Non MS model) or CAMERA-TAPE mode (MS model).

Adjusting method:

1) Select page: 0, address: 01, and set data: 01.
2) Select page: F, address: 5A (Non MS model) or address: 66 (MS model), and set data: 00, then press the PAUSE button on the adjusting remote commander.
3) Place the Siemens Star at 2 m position away from the lens.
4) Shoot the Siemens Star with the zoom at TELE end.
5) Change the lens direction so that the center of Siemens Star coincides with the center of optical axis deviation specification frame.
6) Shoot the Siemens Star with the zoom at WIDE end.
7) Check on the monitor TV which area the center of Siemens Star exists of the optical axis deviation specification frame.
At this time, measure the amount of deviation "L1" (distance from the center of Siemens Star to the center of optical axis deviation specification frame).
8) From the following table, read correction data according to the area.
9) Select page: F, address: 5A (Non MS model) or address: 66 (MS model), and set correction data, then press the PAUSE button on the adjusting remote commander.
10) Shoot the Siemens Star with the zoom at TELE end.
11) Change the lens direction so that the center of Siemens Star coincides with the center of optical axis deviation specification frame.
12) Shoot the Siemens Star with the zoom at WIDE end.
13) Measure the amount of deviation "L2" (distance from the center of Siemens Star to the center of optical axis deviation specification frame).
14) Compare L1 and L2, and make sure that the L2 is smaller than L1.
If large, select page: F, address: 5A (Non MS model) or address: 66 (MS model), and set data: 00, then press the PAUSE button on the adjusting remote commander.

Area	Deviation Phase	Correction Data
1	22.6° to 67.5°	01
2	67.6° to 112.5°	02
3	112.6° to 157.5°	03
4	157.6° to 202.5°	04
5	202.6° to 247.5°	05
6	247.6° to 292.5°	06
7	292.6° to 337.5°	07
8	337.6° to 22.5°	08

Processing after completion of adjustment:

1) Select page: 0, address: 01, and set data: 00.

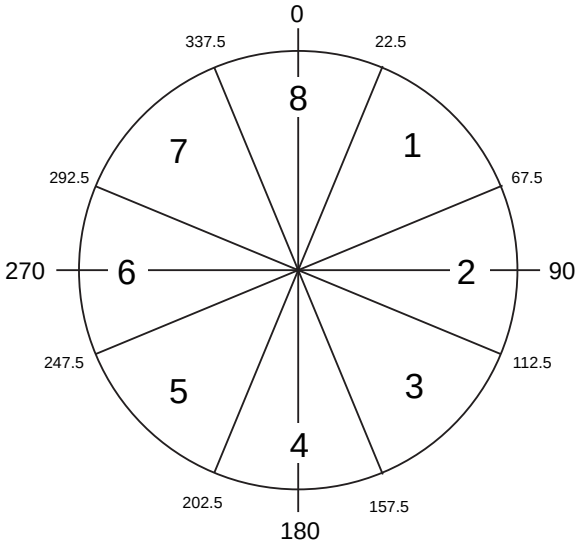


Fig. 6-1-11

7. Picture Frame Setting (Color reproduction adjustment frame)

Subject	Color bar chart (Color reproduction adjustment frame) (1 m (PTB-450) or 40 cm (PTB-1450) from the front of lens)
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope and monitor TV
Specified Value	A=B, C=D, E=F

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Perform "Flange Back Adjustment" and "Optical Axis Adjustment" before this adjustment.
Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Setting method:
1) Select page: 6, address: 48, and set data: 02.
2) Adjust the zoom and the camera direction, and set to the specified position.
3) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "Color reproduction adjustment frame".

Processing after completing camera system adjustments:
1) Select page: 6, address: 48, and set data: 00.

Check on the oscilloscope

1. Horizontal period

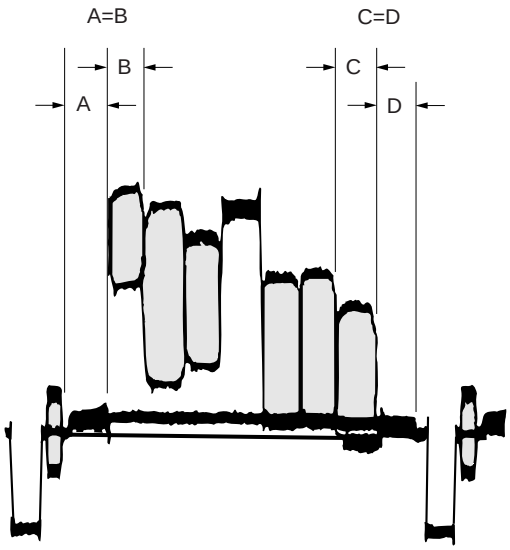


Fig. 6-1-12

2. Vertical period

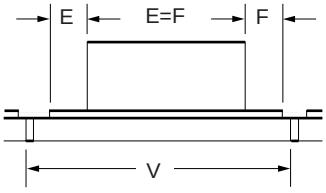


Fig. 6-1-13

Check on the monitor TV (Underscanned mode)

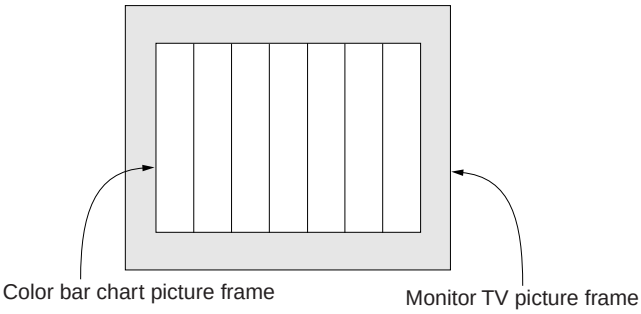


Fig. 6-1-14

8. Picture Frame Setting (Center frame)

Subject	Clear chart (Center frame) (1 m (PTB-450) or 40 cm (PTB-1450) from the front of lens)
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)
Measuring Instrument	Monitor TV
Specified Value	Whole of the screen is white

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) ZOOM ..... WIDE end
4) DIGITAL ZOOM (Menu setting) ..... OFF
5) STEADYSHOT (Menu setting) ..... OFF

Setting method:
1) Select page: 6, address: 48, and set data: 02.
2) Shoot a clear chart in the center of screen with the zoom at WIDE end.
3) Check with the zoom at WIDE end that the clear chart is shot larger than the size shown in the figure. (Fig.6-1-15)
4) In the following adjustment, if the "Center frame" is used, adjust the clear chart to this position.

Processing after completing camera system adjustments:
1) Select page: 6, address: 48, and set data: 00.

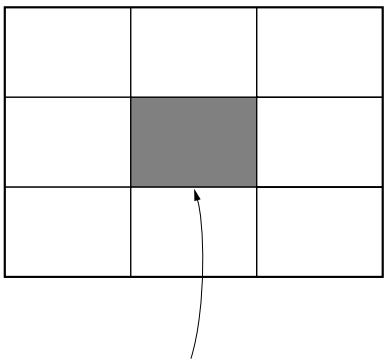


Fig. 6-1-15

9. F No. Standard Data Input RadarW

Adjust the dispersion of the lens iris every F mumber, and compensate the exposure.

Subject	Clear chart (Center frame)
Measuring Instrument	Adjusting remote commander
Adjustment Page	F
Adjustment Address	1C to 23

Note 1: Perform "HALL Adjustment" and "Flange Back Adjustment" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00".
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: If the pattern box (PTB-450) is used, the stability of brightness is reduced, and thus the adjustment value will be shifted a little.
The use of small pattern box (PTB-1450) is recommended.
Note 5: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) ZOOM ..... WIDE end
4) DIGITAL ZOOM (Menu setting) ..... OFF
5) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Center frame". If not, perform "8. Picture Frame Setting (Center Frame)".
2	0	01	01	
3	6	48	02	
4	6	01	BB	Press PAUSE button. (Note 6)
5	6	02		Check the data changes to "01".
6	6	0C		Check the data is "00".

Note 6: The adjustment data will be automatically input to page: F, address: 1C to 23.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	01	00	

10. Mechanical Shutter Adjustment (DCR-HC32/HC32E/HC33/HC33E) RadarW

Adjustment Page	F
Adjustment Address	68 to 7D

Note 1: Check that the data of page: 0, address: 10 is “00”.
Note 2: NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Adjusting method:

1) Select page: 0, address: 01, and set data: 01.
2) Input the following data to page: F, address: 76 to 8B.

Note: Press the PAUSE button of the adjustment remote commander each time to set data.

Address	Data	
	NTSC	PAL
68	7D	80
69	80	80
6A	80	80
6B	80	80
6C	80	80
6D	7C	7F
6E	38	38
6F	B5	6C
70	29	2A
71	EC	5C
72	24	25
73	5C	3C
74	21	22
75	BD	3A
76	1F	20
77	AB	60
78	60	5E
79	78	77
7A	85	84
7B	87	85
7C	7B	7A
7D	1D	1C

3) Select page: 0, address: 01, and set data: 00.

11. Color Reproduction Adjustment

Adjust the color separation matrix coefficient so that proper color reproduction is produced.

Subject	Color bar chart (Color reproduction adjustment frame)
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	33, 35, 3A, 3B
Specified Value	All color luminance points should settle within each color reproduction frame.

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: Perform "Flange Back Adjustment" and "F No. Standard Data Input" before this adjustment.

Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Note 4: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

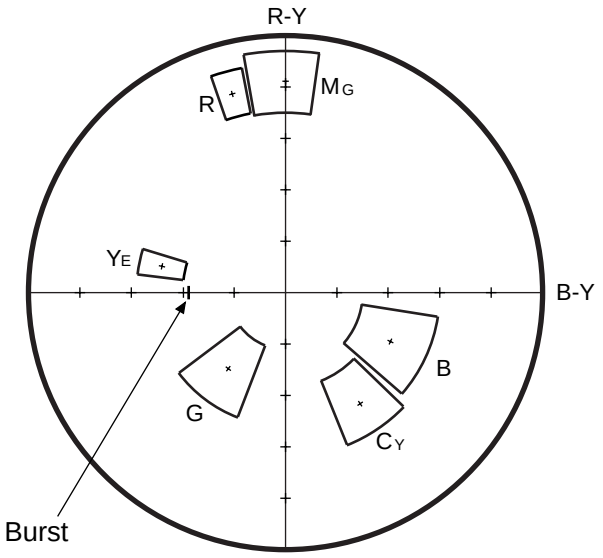
Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	02	
3	6	9D		Set the following data. Non MS model 7E: NTSC model 86: PAL model MS model 80: NTSC model 89: PAL model
4	6	01	3D	Press PAUSE button.
5	F	80		Set the following data, and press PAUSE button. 77: NTSC model F7: PAL model
6				Adjust the GAIN and PHASE of the vectorscope, and set to the burst luminance point to the burst position of color reproduction frame.
7	F	33 35 3A 3B		Change the data and settle each color luminance point in each color reproduction frame. (Note 5)

Note 5: Be sure to press the PAUSE button of the adjusting remote commander before changing the addresses. If not, the new data will not be written to the memory.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	6	9D	00	
4	0	01	00	

NTSC model



PAL model

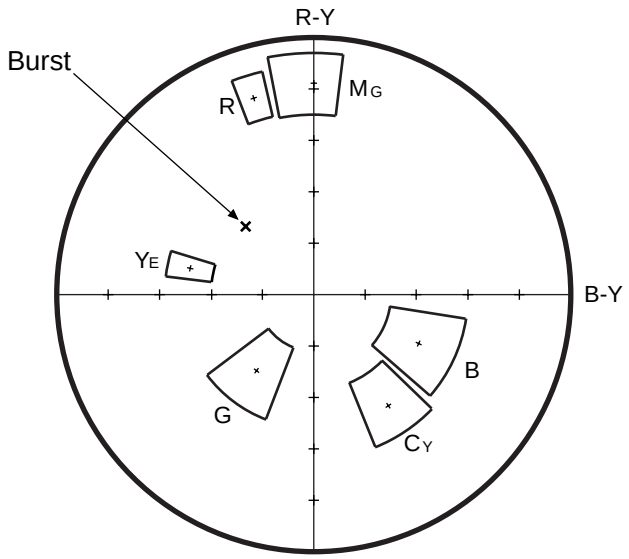


Fig. 6-1-16

12. Auto White Balance Standard Data Input RadarW

Adjust the white balance reference at 3200K.

Subject	Clear chart (Color reproduction adjustment frame)
Adjustment Page	F
Adjustment Address	2A to 2D

Note 1: Perform “Color Reproduction Adjustment” before this adjustment.

Note 2: Check that the data of page: 0, address: 10 is “00”.

Note 3: Check that the data of page: 6, address: 02 is “00”.
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is “Color Reproduction Adjustment Frame”. If not, perform “7. Picture Frame Setting (Color Reproduction Adjustment Frame)”.
2	0	01	01	
3				Wait for 2 seconds.
4	6	48	02	
5	6	01	11	Press PAUSE button.
6	6	01	0B	Press PAUSE button. (Note 5)
7	6	02		Check the data changes to “01”.

Note 5: The adjustment data will be automatically input to page: F, address: 2A to 2D.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	01	00	

13. LV Standard Data Input RadarW

Adjust the normal coefficient of the light value.

Subject	Clear chart (Color reproduction adjustment frame)
Measurement Point	Displayed data of page: 1 (Note 4)
Measuring Instrument	Adjusting remote commander
Adjustment Page	F
Adjustment Address	1A, 1B
Specified Value	0FB0 to 1050

Note 1: Perform “Flange Back Adjustment” and “F No. Standard Data Input” before this adjustment.

Note 2: Check that the data of page: 0, address: 10 is “00”.

Note 3: Check that the data of page: 6, address: 02 is “00”.
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 4: The right four digits of the page: 1 displayed data of the adjusting remote commander.

1:XX:XX
└ Displayed data

Note 5: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is “Color Reproduction Adjustment Frame”. If not, perform “7. Picture Frame Setting (Color Reproduction Adjustment Frame)”.
2	0	01	01	
3	6	48	02	
4	6	01	0D	Press PAUSE button. (Note 6)
5	6	02		Check the data changes to “01”.
6	0	03	1E	
7	1			Check that the displayed data (Note 4) satisfied specified value.

Note 6: The adjustment data will be automatically input to page: F, address: 1A and 1B.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	03	00	
4	0	01	00	

14. Auto White Balance Adjustment RadarW

Adjust to the proper auto white balance output data.
If it is not correct, auto white balance and color reproducibility will be poor.

Subject	Clear chart (Color reproduction adjustment frame)
Filter	Filter C14 for color temperature correction
Adjustment Page	F
Adjustment Address	2E to 31, 3E to 41

Note 1: Perform "Auto White Balance Standard Data Input" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00".
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Color Reproduction Adjustment Frame". If not, perform "7. Picture Frame Setting (Color Reproduction Adjustment Frame)".
2				Place the C14 filter on the lens.
3	0	01	01	
4	6	48	02	
5	F	3E		Set the following data, and press PAUSE button. 29: NTSC model 2A: PAL model
6	F	3F		Set the following data, and press PAUSE button. F8: NTSC model B8: PAL model
7	F	40	5B	Press PAUSE button.
8	F	41	20	Press PAUSE button.
9	6	01	83	Press PAUSE button.
10	6	01	81	Press PAUSE button. (Note 6)
11	6	02		Check the data changes to "01".

Note 6: The adjustment data will be automatically input to page: F, address: 2E to 31.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	01	00	
4				Remove the C14 filter on the lens.

15. Auto White Balance Check RadarW

Subject	Clear chart (Color reproduction adjustment frame)	
Filter	Filter C14 for color temperature correction ND filter 1.0, 0.4 and 0.1	
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)	Displayed data of page: 1 (Note 3)
Measuring Instrument	Vectorscope	Adjusting remote commander
Specified Value	Fig. 6-1-17 (A) and (B)	NTSC model R ratio: 29B8 to 2A38 B ratio: 5AE0 to 5B60 InOut data: 8000 to 8BC0
		PAL model R ratio: 2A78 to 2AF8 B ratio: 5AE0 to 5B60 InOut data: 8000 to 8BC0

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Perform "Auto White Balance Adjustment" before this adjustment.
Note 3: The right four digits of the page: 1 displayed data of the adjusting remote commander.

1:XX:XX
└ Displayed data

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Checking method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Color Reproduction Adjustment Frame". If not, perform "7. Picture Frame Setting (Color Reproduction Adjustment Frame)".
2				Check that the lens is not covered with either filter.
3	6	48	02	
INDOOR check				
4	6	01	0F	Press PAUSE button.
5				Check that the center of the white luminance point within the circle shown Fig. 6-1-17 (A)
6	6	01	00	Press PAUSE button.
OUTDOOR check				
7				Place the C14 filter on the lens.
8	6	01	3F	Press PAUSE button.
9				Check that the center of the white luminance point within the circle shown Fig. 6-1-17 (B)
10	0	03	04	
11	1			Check that the displayed data (Note 3) satisfied the R ratio specified value.
12	0	03	05	
13	1			Check that the displayed data (Note 3) satisfied the B ratio specified value.
14				Remove the C14 filter
InOut data check				
15				Place the ND filter 1.5 (1.0 + 0.4 + 0.1) on the lens.
16	6	01	00	Press PAUSE button.
17	0	03	06	
18	1			Check that the displayed data (Note 3) satisfied the InOut data specified value.

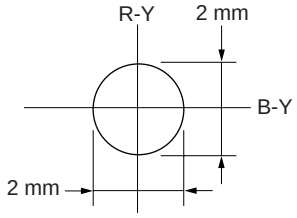


Fig. 6-1-17 (A)

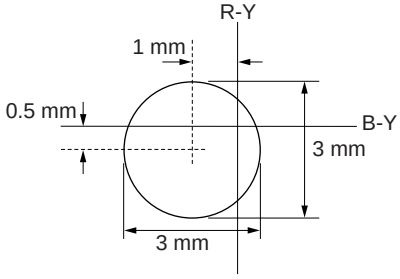


Fig. 6-1-17 (B)

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	03	00	
4				Remove the ND filter 1.5 (1.0 + 0.4 + 0.1) on the lens.

16. MAX GAIN Adjustment RadarW

Setting the minimum illumination.
If it is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	Clear chart (Center frame)
Adjustment Page	F
Adjustment Address	19

Note 1: Perform "Flange Back Adjustment" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) ZOOM ..... WIDE end
4) DIGITAL ZOOM (Menu setting) ..... OFF
5) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Center Frame". If not, perform "8. Picture Frame Setting (Center Frame)".
2	0	01	01	
3	6	48	02	
4	6	96		Set the following data. Non MS model 26: NTSC model 1B: PAL model MS model 24: NTSC model 1B: PAL model
5	6	97	00	
6	6	01	6F	Press PAUSE button. (Note 6)
7	6	02		Check the data changes to "01".

Note 6: The adjustment data will be automatically input to page: F, address: 19.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	48	00	
2	6	96	00	
3	6	97	00	
4	6	01	00	Press PAUSE button.
5	0	01	00	
6				Wait for 3 seconds.

17. Steadyshot Check RadarW

Precautions on the parts replacement

There are two types of repair parts.

Type A ENC03MA
Type B ENC03MB

Replace the broken sensor with a same type sensor. If replace with other type parts, the image will vibrate up and down or left and right during hand-shake correction operations.

Precautions on angular velocity sensor

The sensor incorporates a precision oscillator. Handle it with care as if it dropped, the balance of the oscillator will be disrupted and operations will not be performed properly.

Subject	Not required
Measurement Point	Displayed data of page: 1 (Note 2)
Measuring Instrument	Adjusting remote commander
Specified value	PITCH data: 2680 to 5080 YAW data: 2680 to 5080

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: The right four digits of the page: 1 displayed data of the adjusting remote commander.

1:XX:XX
└── Displayed data

Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) ZOOM ..... TELE end
3) STEADYSHOT (Menu setting) ..... ON

Checking method:

Order	Page	Address	Data	Procedure
PITCH sensor output check (SE601 of SI-042 board)				
1	0	03	11	
2	1			With the set in still state, check that the displayed data (Note 2) satisfies the PITCH data specified value.
YAW sensor output check (SE602 of SI-042 board)				
3	0	03	12	
4	1			With the set in still state, check that the displayed data (Note 2) satisfies the YAW data specified value.
5	0	03	00	
Steadyshot operation check				
6				Shake the set vertically and horizontally to check that the steadyshot function operates normally.

1-5. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS

Before perform the electronic viewfinder system adjustments, check that the data of page: 0, address: 10 is “00”. If not, select page: 0, address: 10, and set the data “00”.

Note 1: Taken an extreme care not to destroy the liquid crystal display module by static electricity when replacing it.

Note 2: Perform the following data setting before the viewfinder system adjustments.
1) Select page: 3, address: C4, and set data: 67.
2) Select page: 3, address: C5, and set data: 01.
Reset the data after completing adjustment.
1) Select page: 3, address: C4, and set data: 00.
2) Select page: 3, address: C5, and set data: 00.

1. EVF Automatic Adjustment (LB-109 board)

RadarW

This adjustment does the following items automatically.
VCO Adjustment
Contrast Adjustment

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Adjustment Page	C
Adjustment Address	3F, 40 (VCO Adjustment) 47 (Contrast Adjustment)

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	71	00	Press PAUSE button.
3	3	01	5A	Press PAUSE button. (Note 3)
4	3	02		Check the data changes to “00”.
5	3	03		Check the data is “00”. (Note 4)
6	C	3F		Read the data and this data is named D_{3F}.
7				Convert D_{3F} to decimal notation, and obtain D_{3F}’. (Note 5)
8				Calculate D_{40}’ using following equations. (decimal calculation) D_{40}’ = D_{3F}’ + 10 (NTSC model) D_{40}’ = D_{3F}’– 10 (PAL model)
9				Convert D_{40}’ to a hexadecimal number, and obtain D_{40}. (Note 5)
10	C	40	D_{40}	Press PAUSE button.
11	C	71	41	Press PAUSE button.
12	0	01	00	

Note 3: The adjustment data will be automatically input to page: C, address: 3F and 47.

Note 4: If the data change to “01”, adjustment has error. Contents of error is written into page: 3, address: C6. See the following table.

Note 5: Refer to table 6-4-1. “Hexadecimal-decimal conversion table”.

Data of page: 3, address: C6	Contents of error
5E	VCO adjustment error
61	Contrast adjustment error

1-6. LCD SYSTEM ADJUSTMENTS

Before perform the LCD system adjustments, check that the data of page: 0, address: 10 is “00”.
If not, select page: 0, address: 10, and set the data “00”.

Note 1: Taken an extreme care not to destroy the liquid crystal display module by static electricity when replacing it.
Note 2: Set the “LCD BRIGHT”, “LCD COLOR” to the center with the menu settings of the touch panel.
Note 3: Open the LCD panel during the LCD system adjustment.
Note 4: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

1. LCD Automatic Adjustment (PD-237 board)

RadarW

This adjustment does the following items automatically.
VCO Adjustment
Contrast Adjustment

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Adjustment Page	C
Adjustment Address	50, 51 (VCO Adjustment) 58 (Contrast Adjustment)

Note 1: Check that the data of page: 0, address: 10 is “00”.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	70	00	Press PAUSE button.
3	3	01	5A	Press PAUSE button. (Note 2)
4	3	02		Check the data changes to “00”.
5	3	03		Check the data is “00”. (Note 3)
6	C	50		Read the data and this data is named D_{50}.
7				Convert D_{50} to decimal notation, and obtain D_{50}’. (Note 4)
8				Calculate D_{51}’ using following equations. (decimal calculation) $D_{51}' = D_{50}' + 10$ (NTSC model) $D_{51}' = D_{50}' - 10$ (PAL model)
9				Convert D_{51}’ to a hexadecimal number, and obtain D_{51}. (Note 4)
10	C	51	D_{51}	Press PAUSE button.
11	C	70	41	Press PAUSE button.
12	0	01	00	

Note 2: The adjustment data will be automatically input to page: C, address: 50 and 58.
Note 3: If the data change to “01”, adjustment has error. Contents of error is written into page: 3, address: C6. See the following table.
Note 4: Refer to table 6-4-1. “Hexadecimal-decimal conversion table”.

Data of page: 3, address: C6	Contents of error
58	VCO adjustment error
60	Contrast adjustment error

2. V-COM Adjustment (PD-237 board)

Set the DC bias of the common electrode drive signal of LCD to the specified value.
If deviated, the LCD display will be move, producing flicker and conspicuous vertical lines.

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Measurement Point	Check on LCD screen
Measuring Instrument	
Adjustment Page	C
Adjustment Address	52
Specified Value	The brightness difference between the section-A and section-B is minimum

Note 1: Perform "LCD Automatic Adjustment" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".

Switch setting:
LCD BACKLIGHT ..... ON

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	61	CD	Press PAUSE button.
3	C	52		Change the data so that brightness of the section A and section B is equal.
4	C	52		Subtract 5 from the data.
5	C	52		Press PAUSE button.
6	C	61	C5	Press PAUSE button.
7	0	01	00	

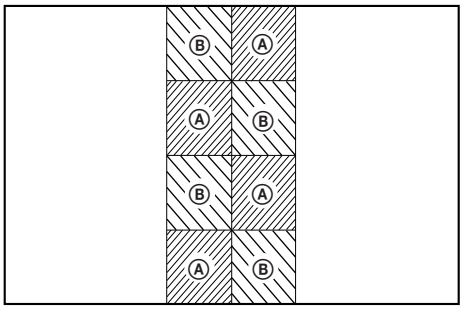


Fig. 6-1-18

3. Transmissive Mode White Balance Adjustment (PD-237 board)

Correct the white balance at transmissive mode.
If deviated, the LCD screen color cannot be reproduced.

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Measurement Point	Check on LCD screen
Measuring Instrument	
Adjustment Page	C
Adjustment Address	56, 57
Specified Value	LCD screen must not be colored

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Check the white balance only when replacing the following parts. If necessary, adjust them.
1. LCD block
2. Light induction plate
3. IC602

Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
LCD BACKLIGHT ..... ON

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	56		Set the following data, and Press PAUSE button. 7D: Non MS model 88: MS model
3	C	57		Set the following data, and Press PAUSE button. 73: Non MS model 71: MS model
4				Check that the LCD screen is not colored. If not colored, proceed to step 6.
5	C	56 57		Change the data so that the LCD screen is not colored. (Note 4)
6	0	01	00	

Note 4: To write in the non-volatile memory (EEPROM), press the PAUSE button each time to set the data.

6-2. MECHANISM SECTION ADJUSTMENTS

On the mechanism section adjustment

For details of mechanism section adjustments, checks, and replacement of mechanism parts, refer to the separate volume "DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) Mechanism ".

Note 1: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

2-1. HOW TO ENTER RECORD MODE WITHOUT CASSETTE

1) Connect the adjustment remote commander to the LANC jack.
2) Turn the HOLD switch of the adjustment remote commander to the ON position.
3) Close the cassette compartment without the cassette.
4) Select page: 3, address: 01, set data: 0C, and press the PAUSE button of the adjustment remote commander.
(The mechanism enters the record mode automatically.)
Note: The function buttons become inoperable.
5) To quit the record mode, select page: 3, address: 01, set data: 00, and press the PAUSE button of the adjustment remote commander. (Whenever you want to quit the record mode, be sure to quit following this procedure.)

2-2. HOW TO ENTER PLAYBACK MODE WITHOUT CASSETTE

1) Connect the adjustment remote commander to the LANC jack.
2) Turn the HOLD switch of the adjustment remote commander to the ON position.
3) Close the cassette compartment without the cassette.
4) Select page: 3, address: 01, set data: 0B, and press the PAUSE button of the adjustment remote commander.
(The mechanism enters the playback mode automatically.)
Note: The function buttons become inoperable.
5) To quit the playback mode, select page: 3, address: 01, set data: 00, and press the PAUSE button of the adjustment remote commander. (Whenever you want to quit the playback mode, be sure to quit following this procedure.)

2-3. TAPE PATH ADJUSTMENT

1. Preparation for Adjustment

1) Clean the tape running side (tape guide, drum, capstan shaft, pinch roller, etc.).
2) Connect the adjustment remote commander to the LANC jack.
3) Turn the HOLD switch of the adjustment remote commander to the ON position.
4) Connect an oscilloscope to CN1007 of VC-376 board (Non MS model) or VC-377 board (MS model) via CPC-15 (J-6082-564-A) and I/F unit for LANC control (J-6082-521-A).
Channel 1: VC-376 board (Non MS model) or VC-377 board (MS model), CN1007 Pin ① (Note)
External trigger: VC-376 board (Non MS model) or VC-377 board (MS model), CN1007 Pin ②

Note: Connect a 75 Ω resistor between pins ① of CN1007 and ③ (GND).
75 Ω resistor (Parts code: 1-247-804-11)

5) Playback the alignment tape for tracking. (XH2-1)
6) Select page: 3, address: 33, and set data: 08.
7) Select page: 3, address: 26, set data: 31, and press the PAUSE button.
8) Check that the oscilloscope RF waveform is normal at the entrance and exit.
If not normal, adjust according to the separate volume "DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) Mechanism" .

CN1007 of VC-376 board (Non MS model) or VC-377 board (MS model)

Pin No.	Signal Name
1	RF_MON
2	SWP
3	GND
4	XCS EEP
5	EEP SCK
6	EEP SO
7	EEP SI
8	GND

2. Procedure after operations

1) Connect the adjustment remote commander to the LANC jack and set the HOLD switch to the ON position.
2) Select page: 3, address: 26, set data: 00, and press the PAUSE button.
3) Select page: 3, address: 33, and set data: 00.

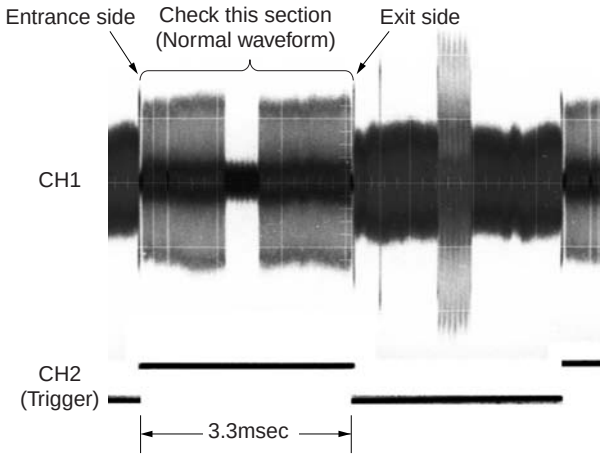


Fig. 6-2-1

6-3. VIDEO SECTION ADJUSTMENTS

3-1. PREPARATIONS BEFORE ADJUSTMENTS

Use the following measuring instruments for video section adjustments.

3-1-1. Equipment Required

1) TV monitor
2) Oscilloscope (dual-phenomenon, band above 30 MHz with delay mode) (Unless specified otherwise, use a 10 : 1 probe.)
3) Pattern generator with video output terminal.
4) Audio generator
5) Audio level meter
6) Audio distortion meter
7) Audio attenuator
8) AC power adapter
9) Alignment tapes
   - Tracking standard (XH2-1)
     Parts code: 8-967-997-01
   - SW/OL standard (XH2-3)
     Parts code: 8-967-997-11
   - Audio operation check for NTSC (XH5-3)
     Parts code: 8-967-997-51
   - System operation check for NTSC (XH5-5)
     Parts code: 8-967-997-61
   - Audio operation check for PAL (XH5-3P)
     Parts code: 8-967-997-55
   - System operation check for PAL (XH5-5P)
     Parts code: 8-967-997-66
10) Adjustment remote commander (J-6082-053-B)
11) CPC connecting jigs
   - CPC-15 (J-6082-564-A)
   - I/F unit for LANC control (J-6082-521-A)

3-1-2. Precautions on Adjusting

Note: Before performing the adjustment, check the data of page: 0, address: 10 is “00”. If not, select page: 0, address: 00, and set data “00”.

1) The adjustments of this unit are performed in the VTR mode (PLAY/EDIT mode) or camera mode (CAMER mode or CAMERA-TAPE mode).

3-1-3. Adjusting Connectors

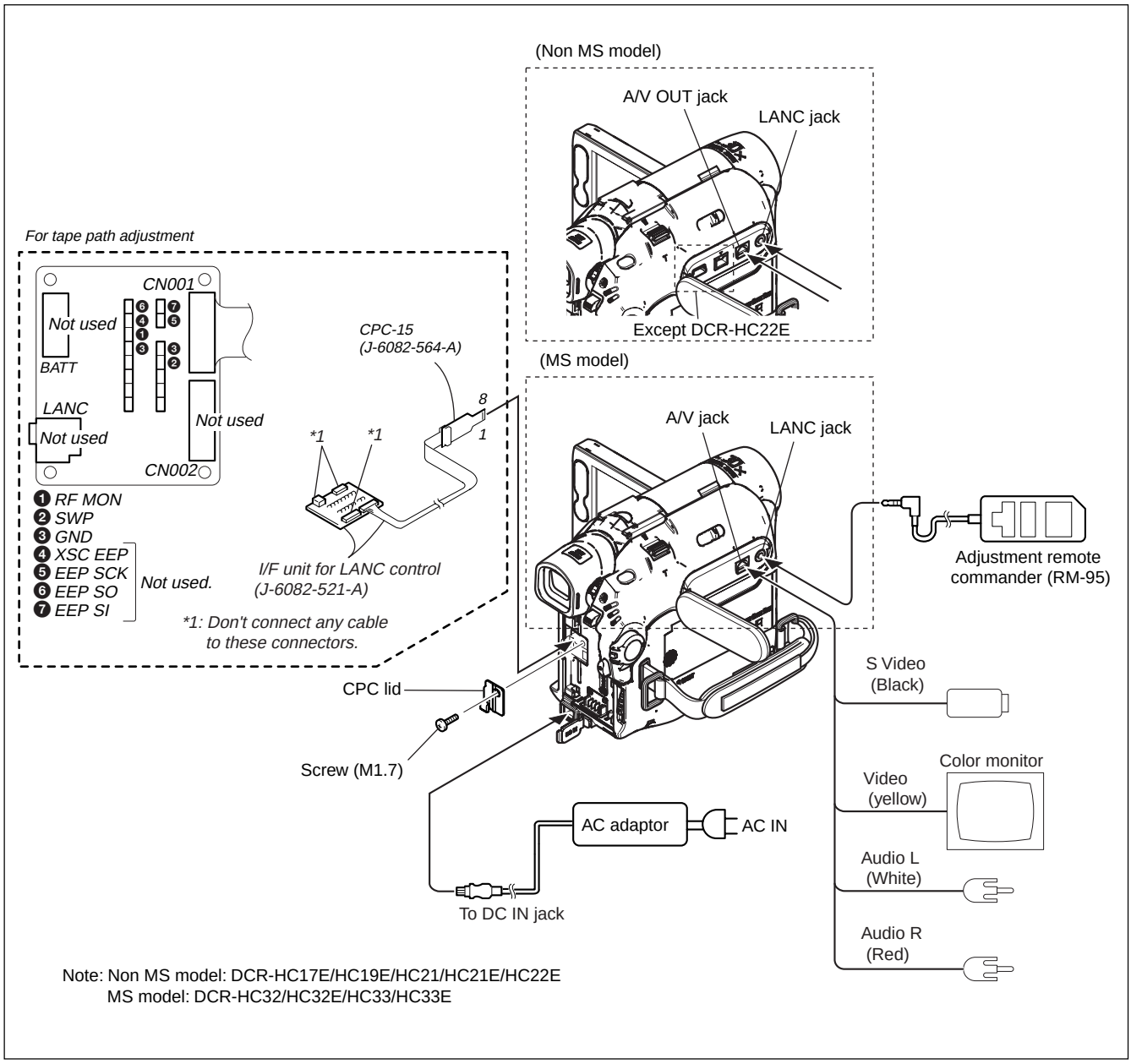
The measuring point of the playback RF signal is CN1007 of VC-376 board or VC-377 board. Connect the measuring instruments via the CPC-15 jig (J-6082-564-A) and I/F unit for LANC control (J-6082-521-A). Refer to “MECHANISM SECTION ADJUSTMENT” for the measuring method. The following table lists the pin numbers and signal names of CN1007.

Pin No.	Signal Name
1	RF_MON
2	SWP
3	GND
4	XCS EEP
5	EEP SCK
6	EEP SO
7	EEP SI
8	GND

Table 6-3-1

3-1-4. Connecting the Equipment

Connect the measuring instruments as shown in Fig. 6-3-1, and perform the adjustments.



Note: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Fig. 6-3-1

3-1-5. Alignment Tapes

Use the alignment tapes shown in the following table.
Use tapes specified in the signal column of each adjustment.

Name	Use
Tracking standard (XH2-1)	Tape path adjustment
SW/OL standard (XH2-3)	Switching position adjustment
Audio operation check (XH5-3(NTSC), XH5-3P(PAL))	Audio system adjustment
System operation check (XH5-5(NTSC), XH5-5P(PAL))	Operation check

Fig. 6-3-2 shows the 75% color bar signals recorded on the alignment tape for Audio Operation Check.

Note: Measure with video terminal (Terminated at 75 Ω)

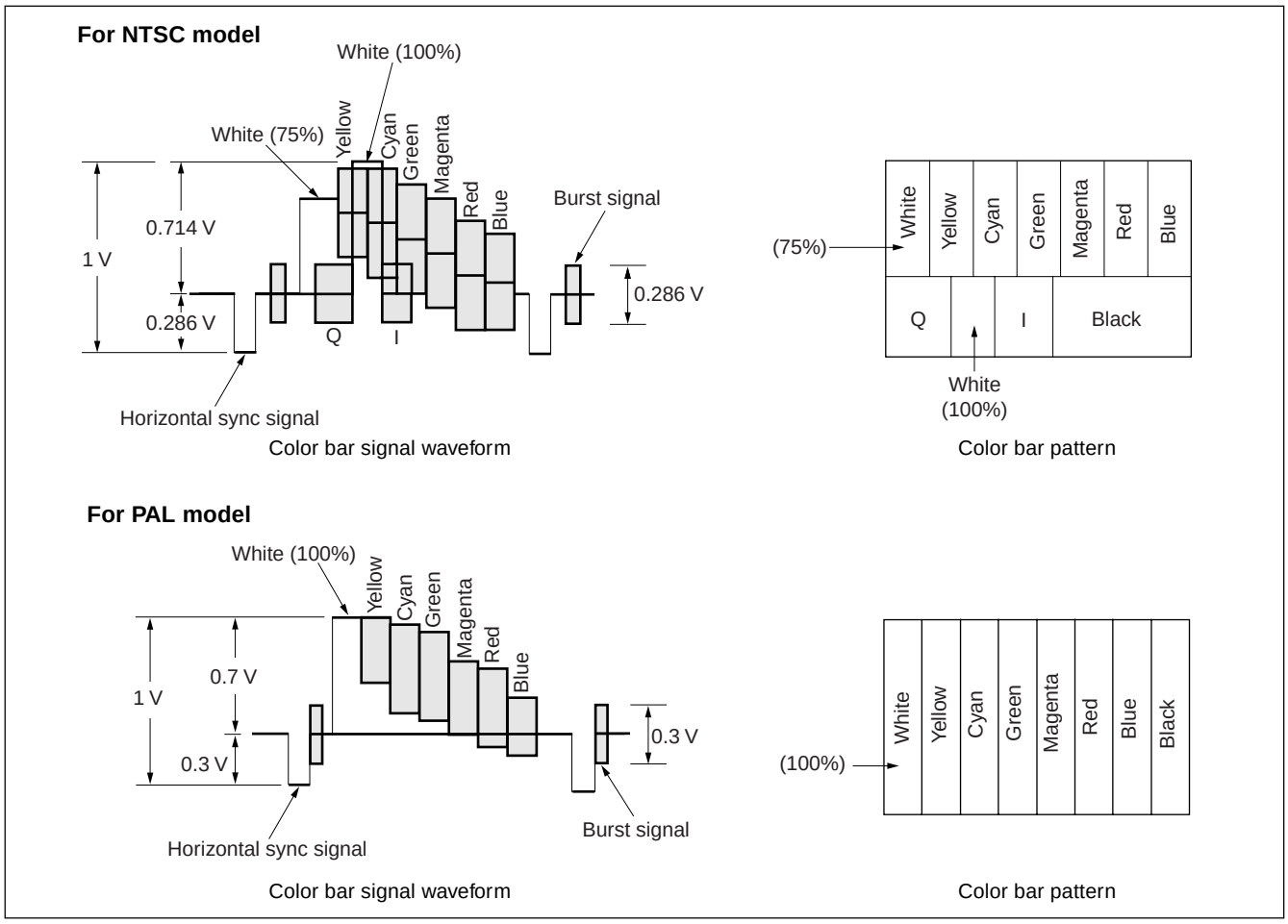


Fig. 6-3-2. Color bar signal of alignment tapes

3-1-6. Input/Output Level and Impedance

Video input/output
A/V jack
Video signal: 1 Vp-p, 75 Ω unbalanced, sync negative

S video input/output
A/V jack
Luminance signal: 1 Vp-p, 75 Ω unbalanced, sync negative
Chrominance signal: 0.286 Vp-p, 75Ω unbalanced (NTSC)
: 0.300 Vp-p, 75Ω unbalanced (PAL)

Audio input/output
A/V jack
Input level: 327mV
Input impedance: More than 47 kΩ
Output level: 327mV (at load impedance 47 kΩ)
Output impedance: Below 2.2 kΩ

3-2. SYSTEM CONTROL SYSTEM ADJUSTMENTS

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

1. Initialization of 8, A, C, D, E, F, 1C, 1F Page Data (Non MS model)

If the 8, A, C, D, E, F, 1C, 1F page data is erased due to some reason, perform "1-2. INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA" of "CAMERA SYSTEM ADJUSTMENTS".
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

2. Touch Panel Adjustment (Non MS model)

Adjust the calibration of touch panel.

Mode	VTR stop (PLAY/EDIT mode)
Signal	Arbitrary
Adjustment Page	A
Adjustment Address	82 to 85

Note 1: This adjustment should be carried out upon completetion of the LCD system adjustments.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the LCD panel is not reverse mode.
Note 4: Adjustment must be performed while observing the LCD screen from the front.

Preparation:

Order	Page	Address	Data	Procedure
1	7	05	01	
2				Check that the touch panel adjustment screen is displayed.
3				Perform "Adjusting method".

Adjusting method:

1) Using a ball-point pen etc., push the center of "×" indicated in the part A.
2) Using a ball-point pen etc., push the center of "×" indicated in the part B.
3) Using a ball-point pen etc., push the center of "×" indicated in the part C.

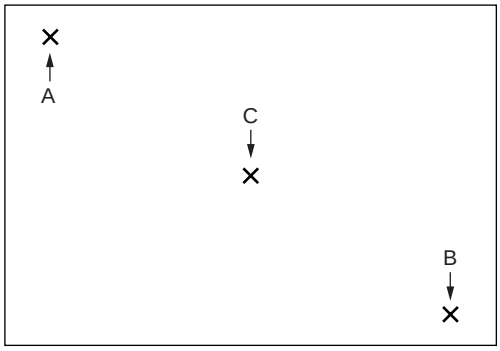


Fig. 6-3-3

3. Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F Page Data (MS model)

If the 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F page data is erased due to some reason, perform "1-3. INITIALIZATION OF 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F PAGE DATA" of "CAMERA SYSTEM ADJUSTMENTS".
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

4. Touch Panel Adjustment (MS model)

Adjust the calibration of touch panel.

Mode	VTR stop (PLAY/EDIT mode)
Signal	Arbitrary
Adjustment Page	A
Adjustment Address	90 to 93

Note 1: This adjustment should be carried out upon completetion of the LCD system adjustments.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that a Memory Stick Duo is not insteted.
Note 4: Check that the LCD panel is not reverse mode.
Note 5: Adjustment must be performed while observing the LCD screen from the front.

Preparation:

Order	Page	Address	Data	Procedure
1	5	01	01	
2	5	05	00	
3	5	06	C7	
4	5	07	00	
5	5	08	00	
6	5	09	00	
7	5	0A	FF	
8	5	0B	00	
9	5	0C	00	
10	5	0D	00	
11	5	0E	01	
12	5	00	01	Press PAUSE button.
13				Check that the touch panel adjustment screen is displayed.
14				Perform "Adjusting method".

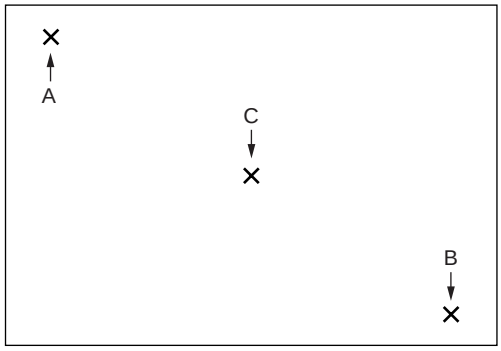


Fig. 6-3-4

Adjusting method:

1) Using a ball-point pen etc., push the center of "×" indicated in the part A.
2) Using a ball-point pen etc., push the center of "×" indicated in the part B.
3) Using a ball-point pen etc., push the center of "×" indicated in the part C.

5. Node Unique ID No. Input

Write the serial No. and model code to the EEPROM (nonvolatile memory).

In writing the serial No., a decimal number should be converted into a hexadecimal number.

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: Perform "Node Unique ID No. Input" if the data on page C has been cleared and the node unique ID No. is not found.

Page	C
Address	E5, E6, E7

1) Select page: 0, address: 01, and set data: 01.
2) Read the serial No. from the model name label, and it is assumed to be D_1.
   Example: If serial No. is "77881",
   $D_1 = 77881$
3) From Table 6-3-2, obtain D_2 and H_1 that correspond to D_1.
   Example: If $D_1 = 77881$,
   $D_2 = D_1 - 65536 = 12345$
   $H_1 = FE$

D_1 (decimal)	D_2 (decimal)	H_1 (hexadecimal) (Service model code)
00001 to 65535	D_1	FE
65536 to 131071	$D_1 - 65536$	FE
131072 to196607	$D_1 - 131072$	FE
196608 to 262143	$D_1 - 196608$	FE
262144 to 327679	$D_1 - 262144$	FE
327680 to 393215	$D_1 - 327680$	FE
393216 to 458751	$D_1 - 393216$	FE
458752 to 524287	$D_1 - 458752$	FE
524288 to 589823	$D_1 - 524288$	FE
589824 to 655359	$D_1 - 589824$	FE
655360 to 720895	$D_1 - 655360$	FE
720896 to 786431	$D_1 - 720896$	FE
786432 to 851967	$D_1 - 786432$	FE
851968 to 917503	$D_1 - 851968$	FE
917504 to 983039	$D_1 - 917504$	FE
983040 to 999999	$D_1 - 983040$	FE

Table 6-3-2

4) Enter H_1 to address: E5 on page: C.
   Example: If $H_1 = FE$,
   select page: C, address: E5, and set data: FE, then press the PAUSE button.
5) From Table 6-3-3, obtain the maximum decimal number less than D_2, and it is assumed to be D_3.
   Example: If $D_2 = 12345$.
   $D_3 = 12288$
6) From Table 6-3-3, obtain a hexadecimal number that corresponds to D_3, and it is assumed to be H_3.
   Example: If $D_3 = 12288$,
   $H_3 = 3000$
7) Caluculate D_4 using following equations (decimal caluculation). ($0 \leqq D_4 \leqq 225$)
   $D_4 = D_2 - D_3$
   Example: If $D_2 = 12345$ and $D_3 = 12288$,
   $D_4 = 12345 - 12288 = 57$
8) Convert D_4 into a hexadecimal number to obtain H_4. (See Table 6-4-1 "Hexadecimal - decimal conversion table" in 6-4. Service Mode)
   Example: If $D_4 = 57$,
   $H_4 = 39$
9) Enter higher two digits of H_3 to address: E6 on page: C.
   Example: If $H_3 = 3000$,
   select page: C, address: E6, and set data: 30, then press the PAUSE button.
10) Enter H_4 to address: E7 on page: C.
    Example: If $H_4 = 39$,
    select page: C, address: E7, and set data: 39, then press the PAUSE button.
11) Select page: 0, address: 01, and set data: 00.

D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3
0	0000	8192	2000	16384	4000	24576	6000	32768	8000	40960	A000	49152	C000	57344	E000
256	0100	8448	2100	16640	4100	24832	6100	33024	8100	41216	A100	49408	C100	57600	E100
512	0200	8704	2200	16896	4200	25088	6200	33280	8200	41472	A200	49664	C200	57856	E200
768	0300	8960	2300	17152	4300	25344	6300	33536	8300	41728	A300	49920	C300	58112	E300
1024	0400	9216	2400	17408	4400	25600	6400	33792	8400	41984	A400	50176	C400	58368	E400
1280	0500	9472	2500	17664	4500	25856	6500	34048	8500	42240	A500	50432	C500	58624	E500
1536	0600	9728	2600	17920	4600	26112	6600	34304	8600	42496	A600	50688	C600	58880	E600
1792	0700	9984	2700	18176	4700	26368	6700	34560	8700	42752	A700	50944	C700	59136	E700
2048	0800	10240	2800	18432	4800	26624	6800	34816	8800	43008	A800	51200	C800	59392	E800
2304	0900	10496	2900	18688	4900	26880	6900	35072	8900	43264	A900	51456	C900	59648	E900
2560	0A00	10752	2A00	18944	4A00	27136	6A00	35328	8A00	43520	AA00	51712	CA00	59904	EA00
2816	0B00	11008	2B00	19200	4B00	27392	6B00	35584	8B00	43776	AB00	51968	CB00	60160	EB00
3072	0C00	11264	2C00	19456	4C00	27648	6C00	35840	8C00	44032	AC00	52224	CC00	60416	EC00
3328	0D00	11520	2D00	19712	4D00	27904	6D00	36096	8D00	44288	AD00	52480	CD00	60672	ED00
3584	0E00	11776	2E00	19968	4E00	28160	6E00	36352	8E00	44544	AE00	52736	CE00	60928	EE00
3840	0F00	12032	2F00	20224	4F00	28416	6F00	36608	8F00	44800	AF00	52992	CF00	61184	EF00
4096	1000	12288	3000	20480	5000	28672	7000	36864	9000	45056	B000	53248	D000	61440	F000
4352	1100	12544	3100	20736	5100	28928	7100	37120	9100	45312	B100	53504	D100	61696	F100
4608	1200	12800	3200	20992	5200	29184	7200	37376	9200	45568	B200	53760	D200	61952	F200
4864	1300	13056	3300	21248	5300	29440	7300	37632	9300	45824	B300	54016	D300	62208	F300
5120	1400	13312	3400	21504	5400	29696	7400	37888	9400	46080	B400	54272	D400	62464	F400
5376	1500	13568	3500	21760	5500	29952	7500	38144	9500	46336	B500	54528	D500	62720	F500
5632	1600	13824	3600	22016	5600	30208	7600	38400	9600	46592	B600	54784	D600	62976	F600
5888	1700	14080	3700	22272	5700	30464	7700	38656	9700	46848	B700	55040	D700	63232	F700
6144	1800	14336	3800	22528	5800	30720	7800	38912	9800	47104	B800	55296	D800	63488	F800
6400	1900	14592	3900	22784	5900	30976	7900	39168	9900	47360	B900	55552	D900	63744	F900
6656	1A00	14848	3A00	23040	5A00	31232	7A00	39424	9A00	47616	BA00	55808	DA00	64000	FA00
6912	1B00	15104	3B00	23296	5B00	31488	7B00	39680	9B00	47872	BB00	56064	DB00	64256	FB00
7168	1C00	15360	3C00	23552	5C00	31744	7C00	39936	9C00	48128	BC00	56320	DC00	64512	FC00
7424	1D00	15616	3D00	23808	5D00	32000	7D00	40192	9D00	48384	BD00	56576	DD00	64768	FD00
7680	1E00	15872	3E00	24064	5E00	32256	7E00	40448	9E00	48640	BE00	56832	DE00	65024	FE00
7936	1F00	16128	3F00	24320	5F00	32512	7F00	40704	9F00	48896	BF00	57088	DF00	65280	FF00

Note: D_3: Decimal
H_3: Hexadecimal

Table 6-3-3

3-3. SERVO AND RF SYSTEM ADJUSTMENTS

Before perform the servo and RF system adjustments, check that the specified values of "36MHz Origin Oscillation Adjustment" of "1-3. CAMERA SYSTEM ADJUSTMENTS" is satisfied. Check that the data of page: 0, address: 10 is "00". If not, select page: 0, address: 10, and set the data "00".

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Adjusting Procedure:
1. CAP FG duty adjustment
2. Switching position adjustment
3. Error rate check

1. CAP FG Duty Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

RadarW

Set the CAP FG signal duty cycle to 50% to establish an appropriate capstan servo. If deviated, the uneven rotation of capstan and noise can occur in the LP mode.

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Measurement Point	Displayed data of page: 3, address: 03
Measuring Instrument	Adjusting remote commander
Adjustment Page	C
Adjustment Address	16
Specified value	The data of page: 3, address: 03 is "00"

Note 1: Check that the data of page: 0, address: 10 is "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1				Close the cassette compartment without inserting cassette.
2	0	01	01	
3	3	01	1B	Press PAUSE button.
4	3	02		Check the data changes in the following order "1B" → "2B" → "00"
5	3	03		Check the data is "00". (Note 2)
6	0	01	00	

Note 2: If the data is "01", adjustment has errors or the mechanism deck is defective.

2. Switching Position Adjustment
(VC-376 board (Non MS model))
(VC-377 board (MS model))

RadarW

Mode	VTR playback (PLAY/EDIT mode)
Signal	SW/OL standard (XH2-3)
Measurement Point	Displayed data of page: 3, address: 03
Measuring Instrument	Adjusting remote commander
Adjustment Page	C
Adjustment Address	10, 11, 12, 13
Specified value	The data of page: 3, address: 03 is "00"

Note 1: Check that the data of page: 0, address: 10 is "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1				Insert the SW/OL standard tape and enter the VTR stop mode.
2	0	01	01	
3	C	10	EE	Press PAUSE button.
4	3	21		Check the data is "02". (Note 2)
5	3	01	0D	Press PAUSE button.
6	3	02		Check the data changes to "00".
7	3	03		Check the data is "00". (Note 3)
8	0	01	00	

Note 2: If the data is "72", the tape top being played. After playing the tape for 1 to 2 seconds, stop it, perform step 5 and higher.
If the data is "62", the tape end being played. After rewind the tape, perform step 5 and higher.

Note 3: If bit0 of the data is "1", the EVEN channel is defective.
If bit1 of the data is "1", the ODD channel is defective.
Contents of the defect is see written into page: C, address: 10 and 12. See following table.
(For the bit values, refer to "6-4. SERVICE MODE", "4-3. 5. Bit value discrimination".)
If bit3 of the data is "1", the tape end being played, so rewind the tape and perform the adjustment again.

When the EVEN channel is defective

Data of page: C, address: 10	Contents of defect
EE	Writing into EEP ROM (IC8602 (Non MS model) or IC5302 (MS model)) is defective
E8	Adjustment data is out of range
E7	No data is returned from IC6001 (Non MS model) or IC4201 (MS model)

When the ODD channel is defective

Data of page: C, address: 12	Contents of defect
EE	Writing into EEP ROM (IC8602 (Non MS model) or IC5302 (MS model)) is defective
E8	Adjustment data is out of range
E7	No data is returned from IC6001 (Non MS model) or IC4201 (MS model)

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

3. Error Rate Check
(VC-376 board (Non MS model))
(VC-377 board (MS model))

RadarW

Note: Check that the data of page: 0, address: 10 is “00”.

3-1. Preparations before adjustments

Mode	Camera recording (CAMERA mode (Non MS model)) (CAMERA-TAPE (MS model))
Subject	Arbitrary

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	01	
3	C	0D	C8	Press PAUSE button.
4	0	10	00	
5				Record the camera signal for 2 minutes.

3-2. Error Rate Check

Mode	VTR playback (PLAY/EDIT mode)
Subject	Recorded signal at “Preparations before adjustments”
Measurement Point	Displayed data of page: 3, address: 03
Measuring Instrument	Adjusting remote commander
Adjustment Page	1C
Adjustment Address	B3 to C8
Specified value	The data of page: 3, address: 03 is “00”

Note 1: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages: C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Initial Value of Page 1C: Address: B3 to C8

Address	Initial value	Address	Initial value	Address	Initial value
B3	00	BB	00	C3	80
B4	00	BC	00	C4	00
B5	00	BD	00	C5	00
B6	00	BE	00	C6	00
B7	00	BF	00	C7	00
B8	80	C0	00	C8	00
B9	00	C1	00		
BA	00	C2	00		

Table 6-3-4

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2				Check that the data of page: 1C, address: B3 to C8 is the initial value. (See Table 6-3-4)
3				Playback the recorded signal at “Preparations before adjustments”.
4	3	01	40	Press PAUSE button.
5	3	02		Check the data changes to “00”.
6	3	03		Check the data is “00”. (Note 2)
7				Perform “Processing after Completing Adjustments”.

Note 2: If the data is other than “00”, Error rate is abnormal. For the contents of the abnormality, see the following table.

Data of page: 3, address: 03	Contents of defect
01	EVEN channel is abnormal.
02	ODD channel is abnormal.
03	EVEN channel and ODD channel are abnormal.

Note 3: If Error rate is abnormal, Check the use tape, clean the tape running surface. And after inputting initial values to page 1C: address: B3 to C8, perform re-adjustment. (See Table 6-3-4)

Processing after Completing Adjustment:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	01	
3	C	0D	00	Press PAUSE button.
4	0	10	00	
5	0	01	00	

3-4. VIDEO SYSTEM ADJUSTMENTS

Before perform the video system adjustments, check that the specified values of "36 MHz Origin Oscillation Adjustment" of "1-3. CAMERA SYSTEM ADJUSTMENTS" is satisfied.
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Adjusting Procedure:

1. S VIDEO OUT Y level adjustment
2. S VIDEO OUT chroma level adjustment
3. VIDEO OUT level check

1. S VIDEO OUT Y Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

Mode	CAMERA (Non MS model) CAMERA-TAPE (MS model)
Subject	Arbitrary
Measurement Point	Y signal terminal of S VIDEO plug of A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope
Adjustment Page	C
Adjustment Address	25
Specified value	A = 1000 ± 14 mVp-p

Note 1: Check that the data of page: 0, address: 10 is "00".

Switch setting:

1) DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	8	A0		(Non MS model only) Set the bit value of bit3 is "1", and press PAUSE button. (Note 2)
		4C		(MS model only) Set the bit value of bit1 is "0", and press PAUSE button.(Note 2)
3	3	0C	02	Press PAUSE button.
4	C	25		Change the data and set the Y signal level (A) to the specified value.
5	C	25		Press PAUSE button.
6	3	0C	00	Press PAUSE button.
7	8	A0		(Non MS model only) Set the bit value of bit3 is "0", and press PAUSE button. (Note 2) (MS model only)
		4C		Set the bit value of bit1 is "1", and press PAUSE button.(Note 2)
8	0	01	00	

Note 2: For the bit values, refer to "6-4. SERVICE MODE", "4-3. 5. Bit value discrimination".

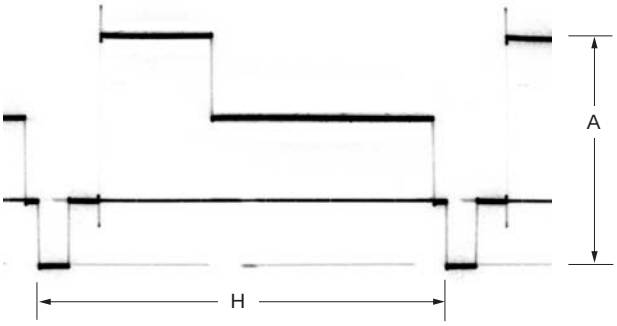


Fig. 6-3-5

2. S VIDEO OUT Chroma Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

Mode	CAMERA (Non MS model) CAMERA-TAPE (MS model)
Subject	Arbitrary
Measurement Point	Chroma signal terminal of S VIDEO plug of A/V jack (75 Ω terminated) External trigger: Y signal terminal of S VIDEO plug of A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope
Adjustment Page	C
Adjustment Address	26, 27
Specified value	Cr level: A = 714 ± 14 mVp-p (NTSC) A = 700 ± 14 mVp-p (PAL) Cb level: B = 714 ± 14 mVp-p (NTSC) B = 700 ± 14 mVp-p (PAL) Burst level: C = 286 ± 6 mVp-p (NTSC) C = 300 ± 6 mVp-p (PAL)

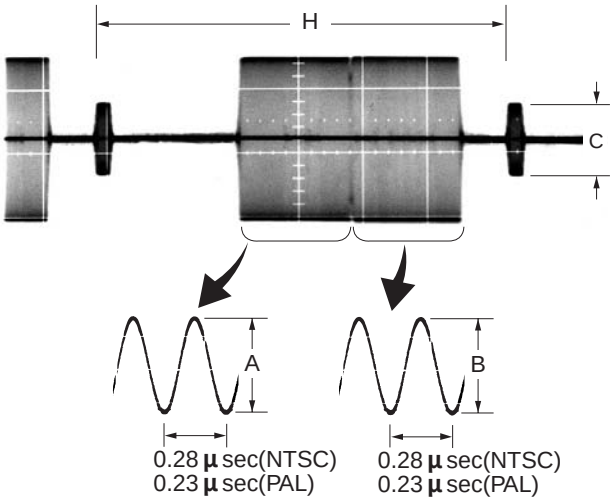


Fig. 6-3-6

Note 1: Check that the data of page: 0, address: 10 is "00".

Switch setting:

1) DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	8	A0		(Non MS model only) Set the bit value of bit3 is "1", and press PAUSE button. (Note 2)
		4C		(MS model only) Set the bit value of bit1 is "0", and press PAUSE button. (Note 2)
3	3	0C	02	Press PAUSE button.
4	C	26		Change the data and set the Cr signal level (A) to the specified value.
5	C	26		Press PAUSE button.
6	C	27		Change the data and set the Cb signal level (B) to the specified value.
7	C	27		Press PAUSE button.
8				Check the burst signal (C) to the specified value.
9	3	0C	00	
10	8	A0		(Non MS model only) Set the bit value of bit3 is "0", and press PAUSE button. (Note 2)
		4C		(MS model only) Set the bit value of bit1 is "1", and press PAUSE button. (Note 2)
11	0	01	00	

Note 2: For the bit values, refer to "6-4. SERVICE MODE", "4-3. 3. Bit value discrimination".

3. VIDEO OUT Level Check (VC-376 board (Non MS model)) (VC-377 board (MS model))

Mode	CAMERA (Non MS model) CAMERA-TAPE (MS model)
Subject	Arbitrary
Measurement Point	Video terminal of A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope
Specified value	Sync level: A = 286 ± 18 mVp-p (NTSC) A = 300 ± 18 mVp-p (PAL) Burst level: B = 286 ± 18 mVp-p (NTSC) B = 300 ± 18 mVp-p (PAL)

Note: Check that the data of page: 0, address: 10 is "00".

Switch setting:

1) DEMO MODE (Menu setting) ..... OFF

Checking method:

Order	Page	Address	Data	Procedure
1	3	0C	02	Press PAUSE button.
2				Check the sync signal level (A) to the specified value.
3				Check the burst signal level (B) to the specified value.
4	3	0C	00	Press PAUSE button.

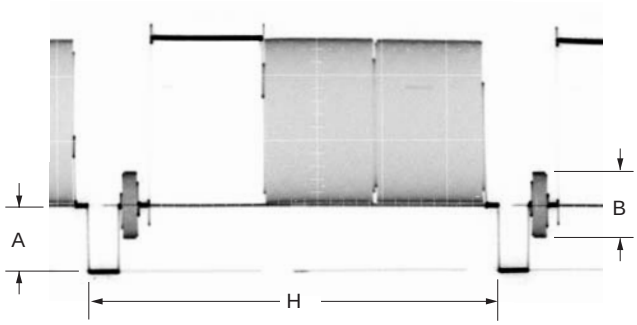


Fig. 6-3-7

3-5. AUDIO SYSTEM ADJUSTMENTS (Non MS model)

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E

[Connecting the measuring instruments for the audio]
Connect the audio system measuring instruments in addition to the video system measuring instruments as shown in Fig. 6-3-8.

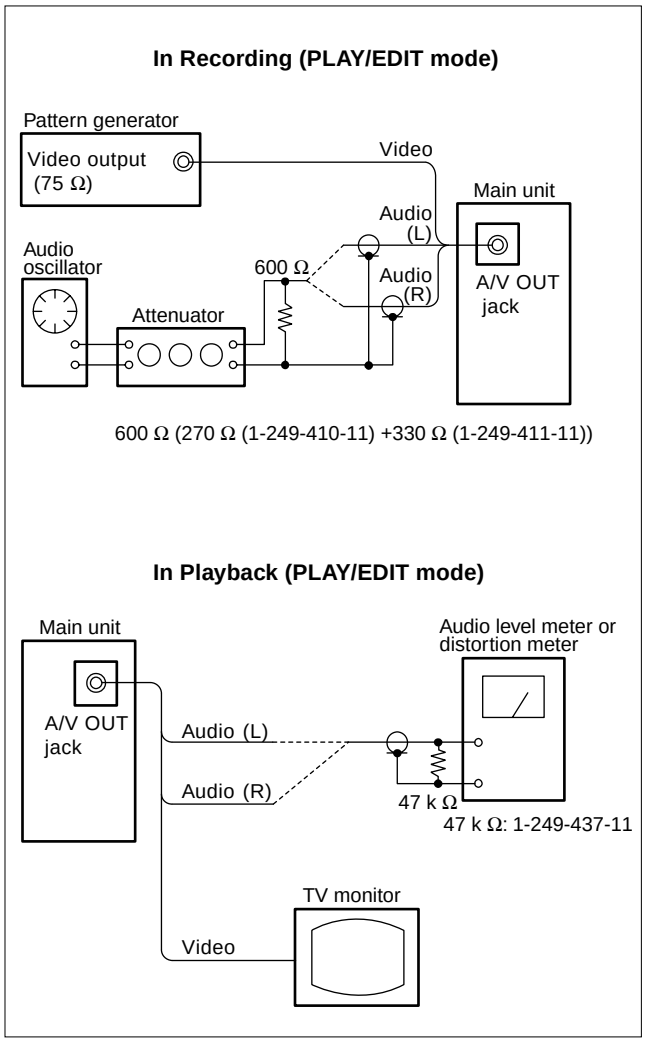


Fig. 6-3-8

1. Playback Level Check

Mode	Playback (PLAY/EDIT mode)
Signal	Alignment tape: For audio operation check (XH5-3 (NTSC)) (XH5-3P (PAL))
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter and frequency counter
Specified Value	32 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 48 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 44.1 kHz mode: The 7.35 kHz signal level during EMP OFF is +2.0 ± 2.0 dBs. The 7.35 kHz signal level during EMP ON is –6 ± 2 dB from the signal level during EMP OFF.

Note : NTSC model: DCR-HC21
PAL model: DCR-HC17E/HC19E/HC21E/HC22E

Checking Method:
1) Check that the playback signal level is the specified value.

2. Overall Level Characteristics Check

Mode	Recording and playback (PLAY/EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V OUT jack
Measurement Point	Audio left or right terminal of A/V OUT jack
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 3.0 dBs

Checking Method:
1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V OUT jack.
3) Record the signal.
4) Remove the input signal.
5) Playback the recorded section.
6) Check that the 400 Hz signal level is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

3. Overall Distortion Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V OUT jack
Measurement Point	Audio left or right terminal of A/V OUT jack
Measuring Instrument	Audio distortion meter
Specified Value	Below 0.4% (200 Hz to 6 kHz BPF ON)

Checking Method:

1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V OUT jack.
3) Record the signal.
4) Remove the input signal.
5) Playback the recorded section.
6) Check that the distortion is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

4. Overall Noise Level Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	No signal: Audio left and right terminal of A/V OUT jack
Measurement Point	Audio left or right terminal of A/V OUT jack
Measuring Instrument	Audio level meter
Specified Value	Below –45 dBs (IHF-A filter ON, 20 kHz LPF ON)

Checking Method:

1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Connect the audio left terminal of A/V OUT jack to GND using a jumper wire.
   Connect the audio right terminal of A/V OUT jack to GND using a jumper wire.
3) Record the signal.
4) Remove the jumper wires.
5) Playback the recorded section.
6) Check that the noise level is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

5. Overall Separation Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio <right> [left] terminal of A/V OUT jack No signal: Audio <left> [right] terminal of A/V OUT jack
Measurement Point	Audio <left> [right] terminal of A/V OUT jack
Measuring Instrument	Audio level meter
Specified Value	Below –40 dBs

< > : Left channel check
[ ] : Right channel check

Checking Method:

1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Input the 400 Hz, –7.5 dBs signal in the audio <right> [left] terminal of A/V OUT jack.
   Connect the audio <left> [right] terminal of A/V OUT jack to GND using a jumper wire.
3) Record the signal.
4) Remove the input signal, and remove the jumper wire.
5) Playback the recorded section.
6) Check that the signal level of the audio <left> [right] terminal is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

3-6. AUDIO SYSTEM ADJUSTMENTS (MS model)

Note : MS model: DCR-HC32/HC32E/HC33/HC33E

[Connecting the measuring instruments for the audio]
Connect the audio system measuring instruments in addition to the video system measuring instruments as shown in Fig. 6-3-9.

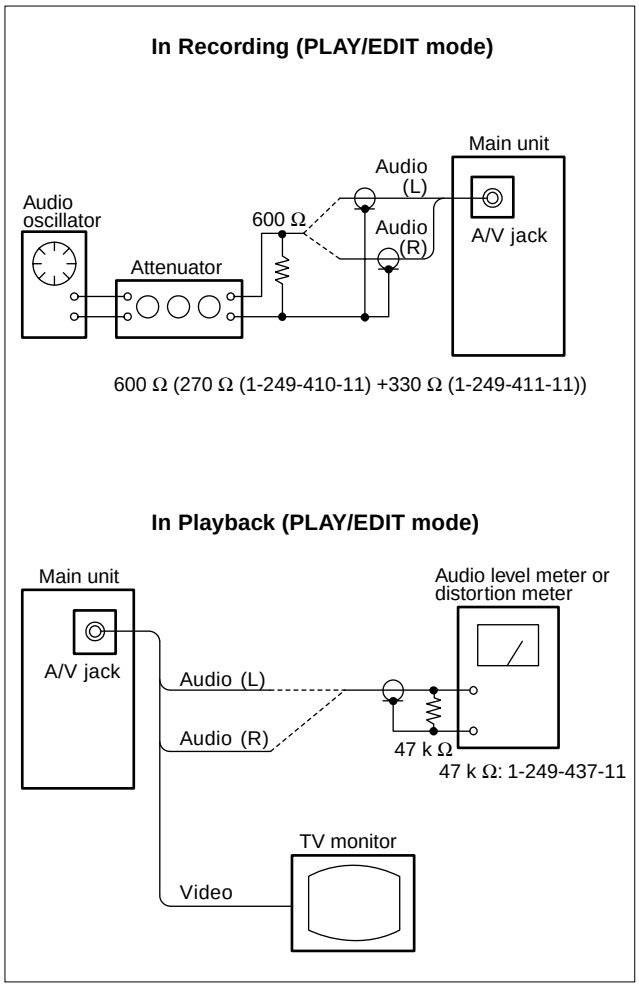


Fig. 6-3-9

1. Playback Level Check

Mode	Playback (PLAY/EDIT mode)
Signal	Alignment tape: For audio operation check (XH5-3 (NTSC)) (XH5-3P (PAL))
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter and frequency counter
Specified Value	32 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 48 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 44.1 kHz mode: The 7.35 kHz signal level during EMP OFF is +2.0 ± 2.0 dBs. The 7.35 kHz signal level during EMP ON is –6 ± 2 dB from the signal level during EMP OFF.

Note : NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Checking Method:
1) Check that the playback signal level is the specified value.

2. Overall Level Characteristics Check

Mode	Recording and playback (PLAY/EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V jack
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 3.0 dBs

Checking Method:
1) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V jack.
2) Record the signal.
3) Remove the input signal.
4) Playback the recorded section.
5) Check that the 400 Hz signal level is the specified value.

3. Overall Distortion Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V jack
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio distortion meter
Specified Value	Below 0.4% (200 Hz to 6 kHz BPF ON)

Checking Method:

1) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V jack.
2) Record the signal.
3) Remove the input signal.
4) Playback the recorded section.
5) Check that the distortion is the specified value.

4. Overall Noise Level Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	No signal: Audio left and right terminal of A/V jack
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter
Specified Value	Below –45 dBs (IHF-A filter ON, 20 kHz LPF ON)

Checking Method:

1) Connect the audio left terminal of A/V jack to GND using a jumper wire.
   Connect the audio right terminal of A/V jack to GND using a jumper wire.
2) Record the signal.
3) Remove the jumper wires.
4) Playback the recorded section.
5) Check that the noise level is the specified value.

5. Overall Separation Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio <right> [left] terminal of A/V jack No signal: Audio <left> [right] terminal of A/V jack
Measurement Point	Audio <left> [right] terminal of A/V jack
Measuring Instrument	Audio level meter
Specified Value	Below –40 dBs

< > : Left channel check
[ ] : Right channel check

Checking Method:

1) Input the 400 Hz, –7.5 dBs signal in the audio <right> [left] terminal of A/V jack.
   Connect the audio <left> [right] terminal of A/V jack to GND using a jumper wire.
2) Record the signal.
3) Remove the input signal, and remove the jumper wire.
4) Playback the recorded section.
5) Check that the signal level of the audio <left> [right] terminal is the specified value.

6-4. SERVICE MODE

4-1. ADJUSTMENT REMOTE COMMANDER

The adjustment remote commander is used for changing the calculation coefficient in signal processing, EVR data, etc. The adjustment remote commander performs bi-directional communication with the unit using the remote commander signal line (LANC). The resultant data of this bi-directional communication is written in the non-volatile memory.

1. Using the Adjustment Remote Commander

1) Connect the adjustment remote commander to the LANC terminal.
2) Set the HOLD switch of the adjustment remote commander to "HOLD" (SERVICE position). If it has been properly connected, the LCD on the adjustment remote commander will display as shown in Fig. 6-4-1.

Fig. 6-4-1

3) Operate the adjustment remote commander as follows.
   - Changing the page
     The page increases when the EDIT SEARCH+ button is pressed, and decreases when the EDIT SEARCH– button is pressed. There are altogether 16 pages, from 0 to F.

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
LCD Display	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal notation conversion value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

   - Changing the address
     The address increases when the FF (►►) button is pressed, and decreases when the REW (◄◄) button is pressed. There are altogether 256 addresses, from 00 to FF.
   - Changing the data (Data setting)
     The data increases when the PLAY (►) button is pressed, and decreases when the STOP (■) button is pressed. There are altogether 256 data, from 00 to FF.
   - Writing the adjustment data
     The PAUSE button must be pressed to write the adjustment data in the nonvolatile memory. (The new adjusting data will not be recorded in the nonvolatile memory if this step is not performed)
4) After completing all adjustments, turn off the main power supply (8.4 V) once.

2. Precautions Upon Using the Adjustment Remote Commander

Mishandling of the adjustment remote commander may erase the correct adjustment data at times. To prevent this, it is recommended that all adjustment data be noted down before beginning adjustments and new adjustment data after each adjustment.

4-2. DATA PROCESS

The calculation of the DDS display and the adjustment remote commander display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Indicates the hexadecimal-decimal conversion table.

Hexadecimal-decimal Conversion Table

② (Lower digit of hexadecimal)

① Upper digit of hexadecimal	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	77	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
B (b)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: The characters shown in the parenthesis ( ) shown the display on the adjustment remote commander.

(Example) If the DDS display or the adjustment remote commander shows BD (bd);
Because the upper digit of the adjustment number is B (b), and the lower digit is D (d), the meeting point "189" of ① and ② in the above table is the corresponding decimal number.

Table 6-4-1

4-3. SERVICE MODE

Note 1: Before performing the adjustment, check the data of page: 0, address: 10 is “00”. If not, select page: 0, ad dress: 00, and set data “00”.

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/ HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

1. Setting the Test Mode

1-1. Setting the Test Mode (Non MS model)

Page D	Address 10

Data	Function
00	Normal
01	Forced camera power ON (CAMERA mode)
02	Forced VTR power ON (PLAY/EDIT mode)
03	Forced camera + VTR power ON

1-2. Setting the Test Mode (MS model)

Page A	Address 10

Data	Function
00	Normal
01	Forced camera power ON (CAMERA-TAPE mode)
02	Forced VTR power ON (PLAY/EDIT mode)
03	Forced camera + VTR power ON
05	Forced memory power ON (CAMERA-MEMORY mode)

- Before setting the data , select page: 0, address: 01, and set data: 01.
- For page A, the data set will be recorded in the non-volatile memory by pressing the PAUSE button of the adjustment re- mote commander. In this case, take note that the test mode will not be exited even when the main power is turned off (8.4 Vdc).
- After completing adjustments/repairs, be sure to return the data of this address to 00, and press the PAUSE button of the adjust- ment remote commander. And select page: 0, address: 01, and set data: 00.

2. Emergence Memory Address (Non MS model)

2-1. Emergency Memory Address (Camera section)

Page 1F	Address 5A to 5D

Note: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages: F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Address	Contents
5A	EMG code when first error occurs
5B	EMG code when second error occurs
5C	EMG code when third error occurs
5D	EMG code when last error occurs

When no error occurs in this unit, data “00” is written in the above addresses (5A to 5D). when first error occurs in the unit, the data corresponding to the error is written in the first emergency ad- dress (5A). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (5B).
Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (5D).

Note: After completing adjustments, be sure to initialize the data of addresses 5A to 5D to “00”.

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	01	FD	Press PAUSE button.
3	6	02		Check the data changes to “01”.
4	6	01	00	Press PAUSE button.
5	0	01	00	

2-2. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in 1F page, addresses 5A to 5D. The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error

3. Emergence Memory Address (MS model)

3-1. Emergency Memory Address (Camera section)

Page 1F	Address 1C to 1F

Note: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages: F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Address	Contents
1C	EMG code when first error occurs
1D	EMG code when second error occurs
1E	EMG code when third error occurs
1F	EMG code when last error occurs

When no error occurs in this unit, data "00" is written in the above addresses (1C to 1F). when first error occurs in the unit, the data corresponding to the error is written in the first emergency address (1C). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (1D).
Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (1F).

Note: After completing adjustments, be sure to initialize the data of addresses 1C to 1F to "00".

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	01	FD	Press PAUSE button.
3	6	02		Check the data changes to "01".
4	6	01	00	Press PAUSE button.
5	0	01	00	

3-2. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in 1F page, addresses 1C to 1F. The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error

4. Emergence Memory Address (Mechanism section)

Page C	Address F4 to FF

Address	Contents
F4	EMG code when first error occurs
F6	Upper: MSW code when shift starts when first error occurs Lower: MSW code when first error occurs
F7	Lower: MSW code to be moved when first error occurs
F8	EMG code when second error occurs
FA	Upper: MSW code when shift starts when second error occurs Lower: MSW code when second error occurs
FB	Lower: MSW code to be moved when second error occurs
FC	EMG code when last error occurs
FE	Upper: MSW code when shift starts when last error occurs Lower: MSW code when last error occurs
FF	Lower: MSW code to be moved when last error occurs

When no error occurs in this unit, data "00" is written in the above addresses (F4 to FF). when first error occurs in the unit, the data corresponding to the error is written in the first emergency address (F4 to F7). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (F8 to FB).
Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (FC to FF).

Note: After completing adjustments, be sure to initialize the data of addresses F4 to FF to "00".

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	3	01	37	Press PAUSE button.
3	3	02		Check the data changes to "00".
4	0	01	00	

4-1. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in C page, addresses F4, F8 and FC . The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error
10	Loading motor emergency during loading
11	Loading motor emergency during unloading
22	T reel emergency during normal rotation
23	S reel emergency during normal rotation
24	T reel emergency (Short circuit between S reel terminal and T reel terminal)
30	FG emergency at the start up of the capstan
40	FG emergency at the start up of the drum
42	FG emergency during normal rotation of the drum

4-2. MSW Code

MSW when errors occur:

Information on MSW (mode SW) when errors occur

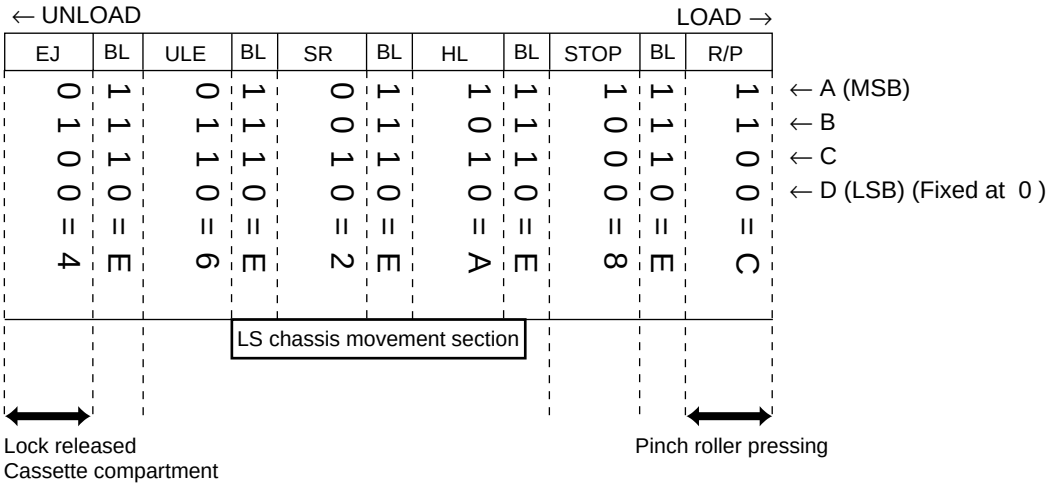
MSW when movement starts:

Information on MSW when movements starts when the mechanism position is moved (When the L motor is moved)

MSW of target of movement:

Information on target MSW of movement when the mechanism position is moved

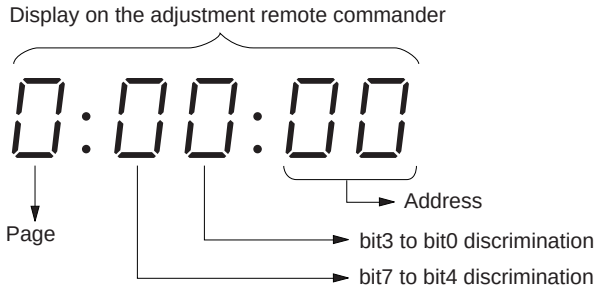
Mechanical Position



Position	Code	Contents
EJ	4	Position at which the cassette component lock is released, at the farthest unload side mechanically at which the mechanism can move no further in the UNLOAD direction.
BL	E	BLANK code, at the boundary between codes.
ULE	6	EJECT completion position. when the cassette is ejected, the mechanism will stop at this position. Cassette IN standby. The guide will start protruding out as the mechanism moves towards the LOAD position.
SR	2	Position at which it is possible to release the S ratchet.
HL	A	Guide loading are performed here.
STOP	8	Stop position in the loading state. The pinch roller separates, the tension regulator returns, and the brake is imposed on both reels.
R/P	C	PB, REC, CUE, REVIEW, PAUSE, FF, REW positions. When pinch roller is pressed, and the tension regulator is ON, the mechanism is operating at this position in modes in which normal images are shown.
NULL	0	Code not existing in the MD. Default value.
	F	Status before finding any mechanism position.

5. Bit Value Discrimination

Bit values must be discriminated using the display data of the adjustment remote commander for the following items. Us the table below to discriminate if the bit value is “1” or “0”.



(Example) If the remote commander display is “8E”, bit value from bit 7 to bit 4 can be discriminated from the column Ⓐ, and those from bit 3 to bit 0 from column Ⓑ.

	Display on the adjustment remote commander	Bit values			
		bit3 or bit7	bit2 or bit6	bit1 or bit5	bit0 or bit4
	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
Ⓐ	8	1	0	0	0
	9	1	0	0	1
	A (A)	1	0	1	0
	B (b)	1	0	1	1
	C (C)	1	1	0	0
	D (d)	1	1	0	1
Ⓑ	E (E)	1	1	1	0
	F (F)	1	1	1	1

6. Jack Check (Non MS model)

6-1. Jack Check (1) (Handycam station) (DCR-HC22E)

Page 7	Address 80

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	CRADLE MULTI jack (CR-050 board CN002)	Used	Not used

Using method:

1) Select page: 7, address: 80.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

6-2. Jack Check (2)

Page 7	Address 0C

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
2	A/V OUT jack (JK-278 board CN701)	Used	Not used
3	A/V OUT jack (JK-278 board CN701)	Used	Not used

Using method:

1) Select page: 7, address: 0C.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

7. Jack Check (MS model)

7-1. Jack Check (1) (Handycam station)

Page 7	Address FB

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	CRADLE MULTI jack (CR-050 board CN002)	Used	Not used

Using method:

1) Select page: 7, address: FB.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

7-2. Jack Check (2)

Page 7	Address F3

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	A/V jack (JK-278 board CN701)	Used	Not used

Using method:

1) Select page: 7, address: F3.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

8. Switch Check (Non MS model)

8-1. Switch Check (1)

Page 2	Address 81

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	POWER (SS10300 block)	ON	OFF
1	MODE CHANGE (SS10300 block)	ON	OFF
2	DISP/BATT INFO (FP-187 fleible S001)	ON	OFF
3	EJECT (SS10300 block S001)	ON	OFF
4	CC DOWN (Mechanism chassis)	ON (DOWN)	OFF (UP)

Using method:

1) Select page: 2, address: 81.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

8-2. Switch Check (2)

Page 7	Address 08

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	Lens Cover (SI-042 board S601)	Close	Open

Using method:

1) Select page: 7, address: 08.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

8-3. Switch Check (3)

Page 7	Address 5C

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
3	REC PROOF SW (Mechanism chassis)	SAVE	REC

Using method:
1) Select page: 7, address: 5C.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

8-4. Switch Check (4)

Page 2	Address 60 to 67

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:
1) Select page: 2, address: 60 to 67.
2) By discriminating the display data, the pressed key can be discriminated.

Address	Data							
	00 to 0C	0D to 24	25 to 3F	40 to 5D	5E to 81	82 to AA	AB to D7	D8 to FF
60 (KEY AD0) (IC8001 ⑲)	START/STOP (SS10300 block) (S004)							No key input
61 (KEY AD1) (IC8001 ⑳)	2nd START/STOP (SB9000 block) (S001)	ZOOM W (SB9000 block) (S003)	ZOOM T (SB9000 block) (S002)	PANEL REVERSE (FP-186 flexble) (S101)				PANEL NORMAL (FP-186 flexble) (S101)
62 (KEY AD2) (IC8001 ㉑)	PHOTO (REC) (SS10300 block) (S002)		PHOTO (FREEZE) (SS10300 block) (S003)					No key input
63 (KEY AD3) (IC8001 ㉕)	EASY (FP-187 flexible) (S002)	BACK LIGHT (FP-187 flexible) (S003)	PANEL CLOSE (FP-187 flexible) (S004)					PANEL OPEN (FP-187 flexble) (S004)
64 (KEY AD4) (IC8001 ㉖)								
65 (KEY AD5) (IC8001 ㉗)								
66 (KEY AD6) (IC8001 ㉘)	A/V OUT jack Used (JK-278 board) (CN701)							A/V OUT jack Not used (JK-278 board) (CN701)
67 (KEY AD7) (IC8001 ㉙)								No key input

9. Switch Check (MS model)

9-1. Switch Check (1)

Page 2	Address 81

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	POWER (SS10300 block)	ON	OFF
1	MODE CHANGE (SS10300 block)	ON	OFF
3	EJECT (SS10300 block S001)	ON	OFF
4	CC DOWN (Mechanism chassis)	ON (DOWN)	OFF (UP)
5	DISP/BATT INFO (FP-187 flexible S001)	ON	OFF

Using method:

1) Select page: 2, address: 81.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

9-2. Switch Check (2)

Page 7	Address 0F

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	Lens cover (SI-042 board S601)	Close	Open

Using method:

1) Select page: 7, address: 0F.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

9-3. Switch Check (3)

Page 7	Address F4

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
4	REC PROOF SW (Mechanism chassis)	SAVE	REC

Using method:

1) Select page: 7, address: F4.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

9-4. Switch Check (4)

Page 7	Address 65 to 6B

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:

1) Select page: 7, address: 65 to 6B.
2) By discriminating the display data, the pressed key can be discriminated.

Address	Data							
	00 to 0C	0D to 26	27 to 43	44 to 63	64 to 8A	8B to B6	B7 to E6	E7 to FF
65 (KEY AD0) (IC5102 ⑬⑨)	START/STOP (SS10300 block) (S004)							No key input
66 (KEY AD1) (IC5102 ⑭⓪)	2nd START/STOP (SB9000 block) (S001)	ZOOM W (SB9000 block) (S003)	ZOOM T (SB9000 block) (S002)	PANEL REVERSE (FP-186 board) (S101)				No key input
67 (KEY AD2) (IC5102 ⑭①)	PHOTO (REC) (SS10300 block) (S002)		PHOTO (FREEZE) (SS10300 block) (S003)					No key input
68 (KEY AD3) (IC5102 ⑭②)	EASY (FP-187 flexible) (S002)	BACK LIGHT (FP-187 flexible) (S003)	PANEL CLOSE (FP-187 flexible) (S004)					PANEL OPEN (FP-187 flexible) (S004)
69 (KEY AD4) (IC5102 ⑭③)								
6A (KEY AD5) (IC5102 ⑭④)								
6B (KEY AD6) (IC5102 ⑭⑤)								

10. LED, IR Light Check (Non MS model)

Page 7	Address 07	Bit5

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:
1) Set the unit to camera mode.
2) Select page: 7, address: 07, and set the bit value of bit5 to “1”.
3) Check that all LED are lit, and that the IR light is lit.
4) Select page: 7, address: 07, and set the bit value of bit5 to “0”.

11. LED, IR Light Check (MS model)

Page 7	Address 00, 01 and 04

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:

Order	Page	Address	Data	Procedure
1				Set the unit to CAMERA-TAPE mode.
2	7	01	90	
3	7	04	01	
4	7	00	01	Press PAUSE button.
5				Check that the all LED are lit, and that the IR light is lit.
6	7	01	90	
7	7	04	00	
8	7	00	01	Press PAUSE button.
9	7	00	00	
10	7	01	00	

12. Record of Use Check (1)

Page 7	Address A4 to AF

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: When the drum was replaced, initialize the drum rotation counted time.
Note 3: Check that the data of page: 0, address: 10 is “00”.

Address	Function		Remarks
A4	Power supplying	Hour (H)	100000th place digit and 10000th place digit of counted time (decimal digit)
A5	time	Hour (M)	1000th place digit and 100th place digit of counted time (decimal digit)
A6		Hour (L)	10th place digit and 1st place digit of counted time (decimal digit)
A7	(BCD code)	Minute	
A8	Drum rotation	Hour (H)	100000th place digit and 10000th place digit of counted time (decimal digit)
A9	counted time	Hour (M)	1000th place digit and 100th place digit of counted time (decimal digit)
AA		Hour (L)	10th place digit and 1st place digit of counted time (decimal digit)
AB	(BCD code)	Minute	
AC	Tape run time	Hour (H)	100000th place digit and 10000th place digit of counted time (decimal digit)
AD		Hour (M)	1000th place digit and 100th place digit of counted time (decimal digit)
AE		Hour (L)	10th place digit and 1st place digit of counted time (decimal digit)
AF	(BCD code)	Minute	

Using method:

1) The record of use data is displayed at page: 7, addresses: A4 to AF.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	A4	00	Press PAUSE button.
2	7	A5	00	Press PAUSE button.
3	7	A6	00	Press PAUSE button.
4	7	A7	00	Press PAUSE button.
5	7	A8	00	Press PAUSE button.
6	7	A9	00	Press PAUSE button.
7	7	AA	00	Press PAUSE button.
8	7	AB	00	Press PAUSE button.
9	7	AC	00	Press PAUSE button.
10	7	AD	00	Press PAUSE button.
11	7	AE	00	Press PAUSE button.
12	7	AF	00	Press PAUSE button.

13. Record of Use Check (2) (Non MS model)

Page 7	Address D0 to D5

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.

Note 2: When the drum was replaced, initialize the drum rotation counted time.

Note 3: Check that the data of page: 0, address: 10 is "00".

Address	Function		Remarks
D0	Eject count without	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
D1	tape	Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
D2	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)
D3	Eject count with tape	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
D4		Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
D5	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)

Using method:

1) The record of use data is displayed at page: 7, addresses: D0 to D5.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	D0	00	Press PAUSE button.
2	7	D1	00	Press PAUSE button.
3	7	D2	00	Press PAUSE button.
4	7	D3	00	Press PAUSE button.
5	7	D4	00	Press PAUSE button.
6	7	D5	00	Press PAUSE button.

14. Record of Use Check (3) (MS model)

Page 7	Address 90 to 95

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: When the drum was replaced, initialize the drum rotation counted time.
Note 3: Check that the data of page: 0, address: 10 is “00”.

Address	Function		Remarks
90	Eject count with tape	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
91		Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
92	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)
93	Eject count without	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
94	tape	Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
95	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)

Using method:
1) The record of use data is displayed at page: 7, addresses: 90 to 95.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	90	00	Press PAUSE button.
2	7	91	00	Press PAUSE button.
3	7	92	00	Press PAUSE button.
4	7	93	00	Press PAUSE button.
5	7	94	00	Press PAUSE button.
6	7	95	00	Press PAUSE button.

15. Record of Use Check (4)

Page 7	Address C8 to CD

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: Check that the data of page: 0, address 10 is “00”.

Address	Function		Remarks
C8	User initial power	Year	After setting the clock, set the date of power on next
C9	on date	Month	
CA	(BCD code)	Day	
CB	Final condensation	Year	
CC	occurrence date	Month	
CD	(BCD code)	Day	

Using method:
1) The record of use data is displayed at page: 7, addresses: C8 to CD.

16. Record of Self-diagnosis Check

Page 7	Address B0 to C6

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: Check that the data of page: 0, address 10 is “00”.

Address	Self-diagnosis code
B0	“Repaired by” code (Occurred 1st time) *1
B1	“Block function” code (Occurred 1st time)
B2	“Detailed” code (Occurred 1st time)
B4	“Repaired by” code (Occurred 2nd time) *1
B5	“Block function” code (Occurred 2nd time)
B6	“Detailed” code (Occurred 2nd time)
B8	“Repaired by” code (Occurred 3rd time) *1
B9	“Block function” code (Occurred 3rd time)
BA	“Detailed” code (Occurred 3rd time)
BC	“Repaired by” code (Occurred 4th time) *1
BD	“Block function” code (Occurred 4th time)
BE	“Detailed” code (Occurred 4th time)
C0	“Repaired by” code (Occurred 5th time) *1
C1	“Block function” code (Occurred 5th time)
C2	“Detailed” code (Occurred 5th time)
C4	“Repaired by” code (Occurred the last time) *1
C5	“Block function” code (Occurred the last time)
C6	“Detailed” code (Occurred the last time)

*1 : “01” → “C”, “03” → “E”

Using method:

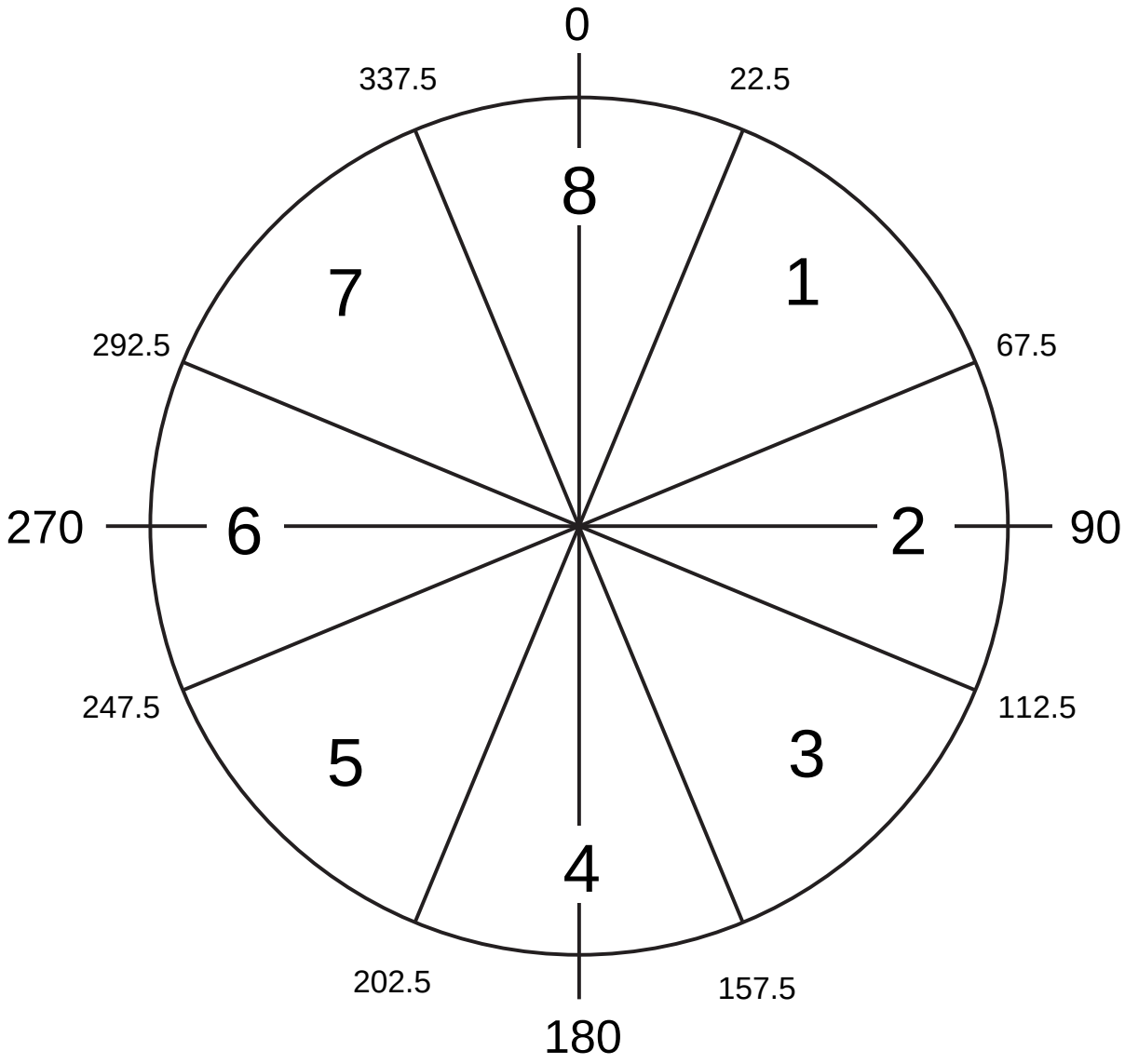
1) The past self-diagnosis codes are displayed at page: 7, address: BC to C6. Refer to “1-4. SELF-DIAGNOSIS FUNCTION” of “SERVICE MANUAL, LEVEL 2 (987678231.pdf)” for detail of the self-diagnosis code.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	01	C0	
2	7	00	01	Press PAUSE button.
3	7	B0 to C6		Check that the data is “00”.
4	7	00	00	
5	7	01	00	

FOR CAMERA OPTICAL AXIS ADJUSTMENT

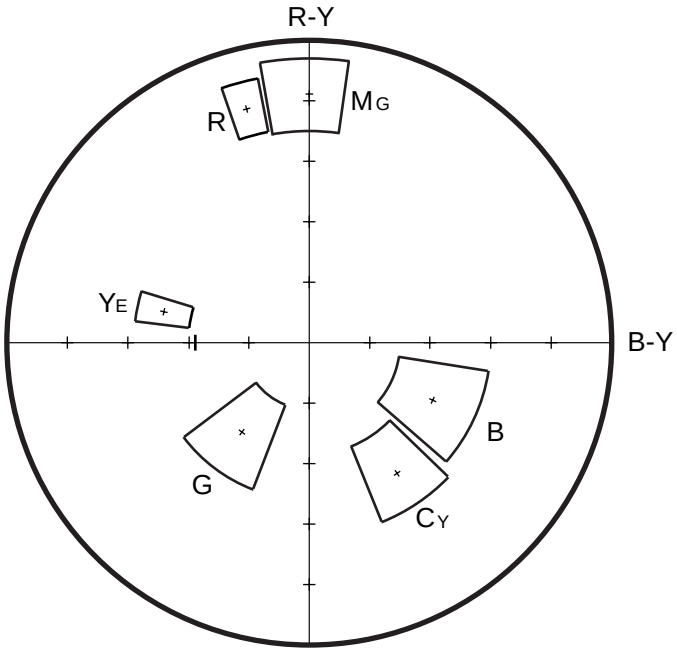
Take a copy of CAMERA OPTICAL AXIS FRAME with a clear sheet for use.



FOR CAMERA COLOR REPRODUCTION ADJUSTMENT

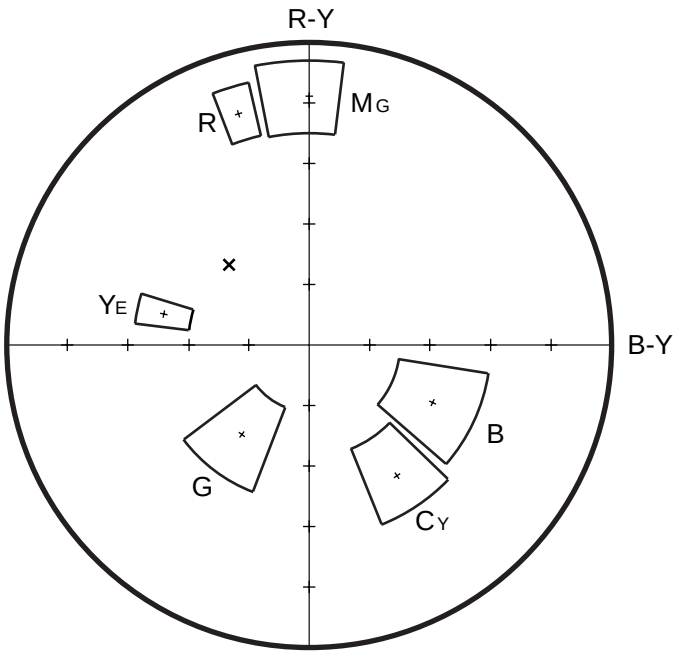
Take a copy of CAMERA COLOR REPRODUCTION FRAME with a clear sheet for use.

For NTSC model



DCR-HC21/HC32/HC33

For PAL model



DCR-HC17E/HC19E/HC21E/HC22E/
HC32E/HC33E

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2005.01	Official Release	—	—

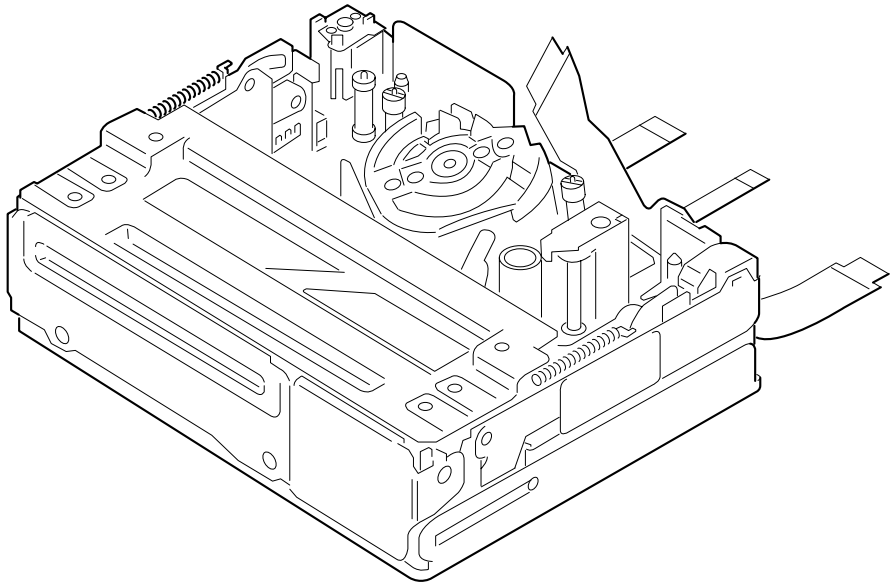
DV MECHANICAL ADJUSTMENT MANUAL VII

Ver 1.0 2003. 01

Z MECHANISM

Mini DV Digital Video Cassette

Please use this manual with the service manual of the respective models.



The capstan motor and the drum base block assy of this mechanism require very high precision work to install them in the mechanism. Therefore, the capstan motor and the drum base block assy are not supplied as the repair part independently. They are supplied as MD (Z100) SUB block assy.

Digital MECHANISM DECK

SONY

TABLE OF CONTENTS

1. Preparations for Check, Adjustment and Replacement of Mechanism Block

1-1. Cassette Compartment Assy, Damper Assy ····· 3

2. Periodic Inspection and Maintenance

2-1. Rotary Drum Cleaning ····· 4
2-2. Tape Path System Cleaning (Refer to Fig. 2-1.) ····· 4
2-3. Periodic Inspection List ····· 5
2-4. Service Jigs and Tools ····· 6
2-5. Mode Selector II Operating Procedure ····· 8
2-5-1. Introduction ····· 8
2-5-2. Operation ····· 8
2-5-3. Mechanism Status (Position) Transition Table Using Mode Selector II ····· 11
2-5-4. Battery Alarm Indication ····· 11

3. Check, Adjustment and Replacement of Mechanical Parts

3-1. Flowchart of Replacement of Mechanical Parts ····· 12
3-2. Drum ····· 13
3-3. Cassette Compartment Assy ····· 14
3-4. TG7 Support ····· 15
3-5. Motor Holder Block Assy and L Motor Block Assy ····· 16
3-6. MIC Terminal (MIC902) ····· 17
3-7. LED (D901) ····· 18
3-8. Retainer Plate ····· 19
3-9. T Reel Table Assy ····· 20
3-10. Brake (S) and Release Rack (S) ····· 21
3-11. Band Adjuster, S Reel Table Assy and TG2 Arm Block Assy ····· 22
3-12. ULE Brake Assy ····· 23
3-13. Cassette Positioning (S) ····· 24
3-14. TG7 Arm Block Assy and Pinch Arm Assy ····· 25
3-15. TG7 ····· 26
3-16. Gooseneck Gear Assy ····· 27
3-17. LS Guide Retainer and LS Cam Plate ····· 28
3-18. LS Chassis Block Assy and Mechanical Chassis Block Assy ····· 29
3-19. Brake (T) Block Assy ····· 30
3-20. END Sensor (Q901) ····· 31
3-21. TOP Sensor (Q902) ····· 32
3-22. C-IN Switch (S903), S Reel Sensor (H901) and T Reel Sensor (H902) ····· 33
3-23. Guide Rail ····· 34
3-24. Conversion Gear ····· 35
3-25. Coaster (S) Block Assy and Coaster (T) Block Assy ····· 36
3-26. TG5 Roller Assy and GL Gear (T) ····· 37
3-27. TG2 Cam Plate Assy ····· 38
3-28. LS Arm Assy ····· 39
3-29. M Slider Assy (1) ····· 40
3-30. M Slider Assy (2) ····· 41
3-31. EJ Arm ····· 42
3-32. Cam Gear and GL Driving ····· 43
3-33. Rotary Encoder (S902) ····· 44
3-34. FP-228 Flexible Board (DEW SENSOR) and FP-467 Flexible Board ····· 45

4. Adjustment

4-1. FWD Position Adjustment ····· 47
4-2. Reel Torque Check ····· 47
4-3. LS Cam Plate Position Adjustment ····· 48
4-4. Tape Path Adjustment ····· 49

5. Exploded Views

Overall Mechanism Deck Section (Z100) ····· 53
LS Chassis Block Assembly ····· 54
Mechanical Chassis Block Assembly ····· 55

6. Schematic Diagrams ····· 56

7. Printed Wiring Boards ····· 57

1. Preparations for Check, Adjustment and Replacement of Mechanism Block

- Refer to the "DISASSEMBLY" section of the SERVICE MANUAL of the respective models for details of removing cabinets and printed wiring boards.
- When making any adjustment to a mechanism or replacing mechanical parts, be sure to use the Mode Selector II and select the appropriate status of the mechanical deck such that the mechanical status is suitable for the desired work. Refer to section "2-5. Mode Selector II" for details on how to enter the mode shown in a rectangle [____] mode in subsequent paragraphs of this manual.

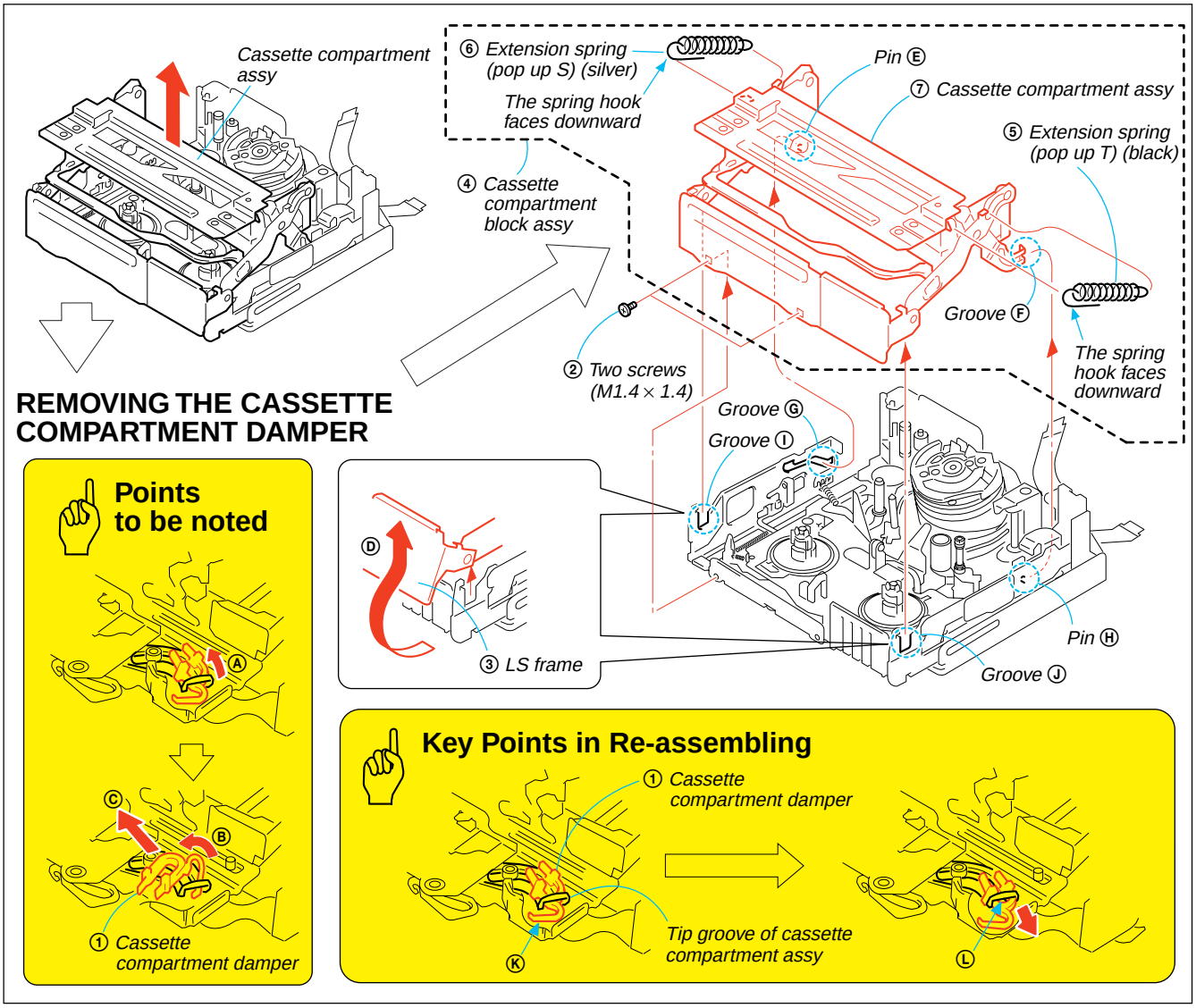
1-1. Cassette Compartment Assy, Damper Assy

1. Removal procedure

1) Set the [EJ] mode.
2) Press the cassette compartment down halfway. Pull the cassette compartment damper ① in the direction of the arrow Ⓐ. Then rotate it in the Ⓑ direction, and remove it in the direction of Ⓒ.
3) Remove the two screws (special head screw M1.4 × 1.4) ②.
4) Remove the LS chassis block assy ③ in the direction of the arrow Ⓓ.
5) Remove the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ from the LS chassis groove Ⓖ and pin Ⓗ. Then remove the cassette compartment block assy ④.
6) Remove the tension spring (POP UP T) (black) ⑤.
7) Remove the tension spring (POP UP S) (silver) ⑥.Then remove the cassette compartment assy ⑦.

2. Attachment procedure

1) Set the [ULE] mode.
2) Install the tension spring (cassette compartment S) (POP UP S) (silver) ⑥ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
3) Install the tension spring (cassette compartment T) (POP UP T) (black) ⑤ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
4) Install the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ into the LS chassis groove Ⓖ and pin Ⓗ.
5) In the status that the LS block assy ③ is kept open, insert it into the grooves Ⓘ and Ⓙ of the LS chassis block assy.
6) Close the LS chassis block assy ③ in the direction opposite to the arrow Ⓓ, and install it with the two screws (special head screw M1.4 × 1.4) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) The cassette compartment down halfway. Pass the Ⓚ portion of the cassette compartment damper ① through the groove at the tip of the cassette compartment. Then pull the Ⓛ portion and fix it using tweezers or something.



2. Periodic Inspection and Maintenance

- Be sure to perform the following maintenance and inspection so that the machine delivers its full performance and functions, and to protect the machine and tape. Also, perform the following maintenance items after completing the repair work, regardless of the number of hours the machine has been operated by the user.

2-1. Rotary Drum Cleaning

1) Press a wiping cloth (Ref. No. J-2) moistened with cleaning fluid (Ref. No. J-1) lightly against the rotary drum. Rotate the upper drum with a super-fine applicator slowly in the counter-clockwise direction to clean the rotary drum.

Caution: Never rotate the rotary drum by turning on the main power of the motor or rotate it in the clockwise direction. Never move the cloth vertically against the head tip, as this will surely damage the video head; the video head must not be cleaned by any other different methods.

2-2. Tape Path System Cleaning (Refer to Fig. 2-1.)

1) Set the EJECT state. Clean the tape running path (TG-1, -2, -3, -4, -5, -6 and -7, pinch roller and capstan shaft) and lower drum with a super-fine applicator (Ref. J-3) moistened with cleaning fluid.

Note 1: Be careful not to allow oil or grease of the various link mechanisms to get on the super-fine applicator (Ref. J-3).
Note 2: Once the super-fine applicator has been moistened with alcohol, do not use it to clean other mechanical parts such as the tape guide. However, the pinch roller is cleaned with alcohol.
Note 3: When cleaning the capstan shaft, be carefull not to move the oil seal. If the oil seal is moved, oil will leak.

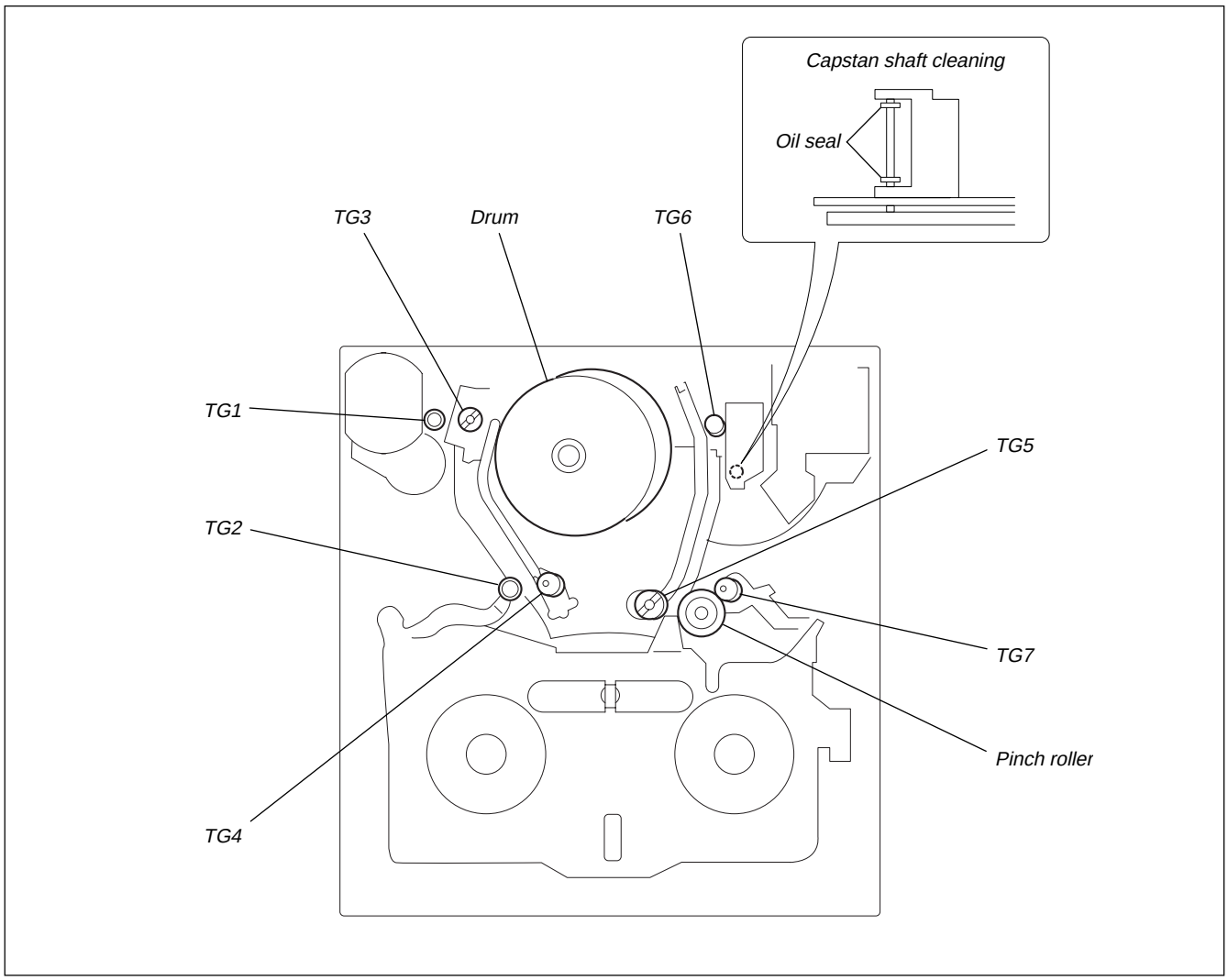


Fig. 2-1

2-3. Periodic Inspection List

Maintenance and inspection item		Operating hours (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Tape running surface cleaning	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
	Rotary drum cleaning and degaussing	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
Drive mechanism	Capstan bearing	—	☆	—	☆	—	☆	—	☆	—	☆	
Drive mechanism	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
Performance check	Back-tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	FWD/RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○: Cleaning, ☆: Check

Note 1: When the machine is overhauled, replace the parts referring to the above list.

Note 2: Grease

- Be sure to use the specified grease only. (If grease of different viscosity is used, it can cause various troubles.)
- The grease must not contain any dust or other matter. (otherwise it can cause various trouble.)
- Observe the noted amount of grease. (otherwise the oozed grease can cause troubles.)
- Suncall FG-87HSR

2-4. Service Jigs and Tools

Ref. No.	Name	Part code	Jig inscription	Used for
J-1	Cleaning fluid	Y-2031-001-0		
J-2	Wiping cloth	7-741-900-53		
J-3	Super-fine applicator (made by Nippon Applicator (P752D))	—		
J-4	Mirror (small oval type)	J-6080-840-A	GD-2038	Tape path
J-5	Tracking tape (XH2-1) (NTSC, PAL)	8-967-997-01		Tape path
J-6	Mini DV torque cassette	J-6082-360-A		
J-7	FWD/BACK T adjustment screwdriver	J-6082-187-A		For TG2 FWD position adjustment
J-8	Torque screwdriver	J-9049-330-A		
J-9	Tape path screwdriver	J-6082-026-A		For tape path adjustment
J-10	Adjustment remote commander (RM-95 upgraded)	J-6082-053-B		
J-11	Mode Selector II	J-6082-282-B		General adjustment (ROM version 1.8)
J-12	Mode Selector II conversion board (Z)	J-6082-493-A		
J-13	Mode Selector II ROM (supporting Z mechanism) * Note 1	J-6082-314-G		ROM for Mode Selector II

Other required equipment: Oscilloscope

Note 1: This is the ROM used for upgrading the version of Mode Selector II to enable it to be used for the Z mechanism.

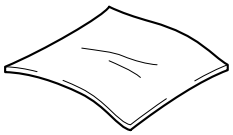
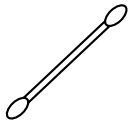
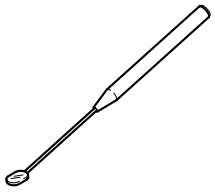
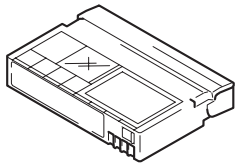
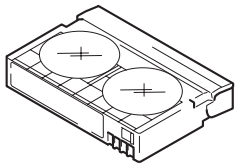
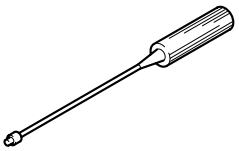
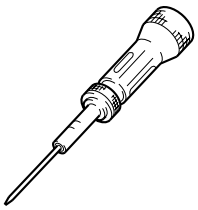
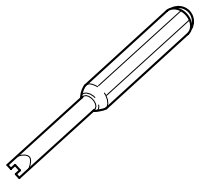
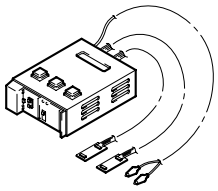
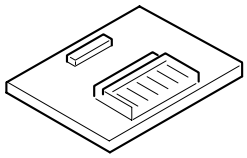
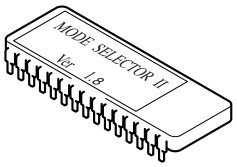
J-1	***J-2*** 	***J-3*** 	***J-4*** 	***J-5*** 
J-6 	***J-7*** 	***J-8*** 	***J-9*** 	***J-10***
J-11 	***J-12*** 	***J-13*** 		

Fig. 2-2

2-5. Mode Selector II Operating Procedure

2-5-1. Introduction

The Mode Selector II is a mechanism drive tool that assists maintenance work of the various mechanism decks. It has the following functions.

1. Manual Test

In this mode, the motor of the mechanism deck is powered only during the period while the switch is turned on manually. Using the Manual Test, the operator can freely control the motor of the mechanism deck.

2. Step Test

In this mode, the motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information. The Step Test is used to confirm a series of movements of the mechanism deck.

3. Auto Test

The Mode Selector II stores the status transition table in its memory as data indicating the respective modes of the mechanism deck. The status transition table can be used to confirm whether a mechanism deck is operating normally or has abnormality from a series of movements of a mechanism deck. If an abnormal status transition is detected during operation, the "NG" indication appears and the mechanism stops moving.

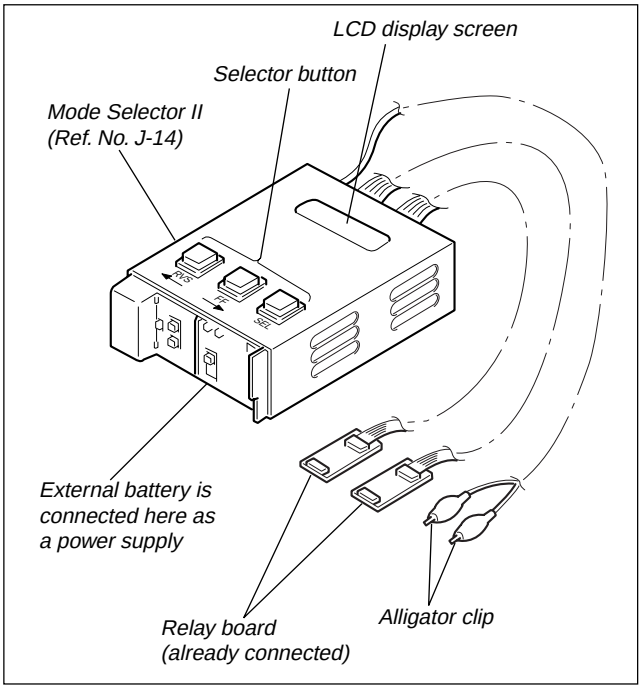


Fig. 2-3

Mode Selector II (J-6082-282-B) connection diagram

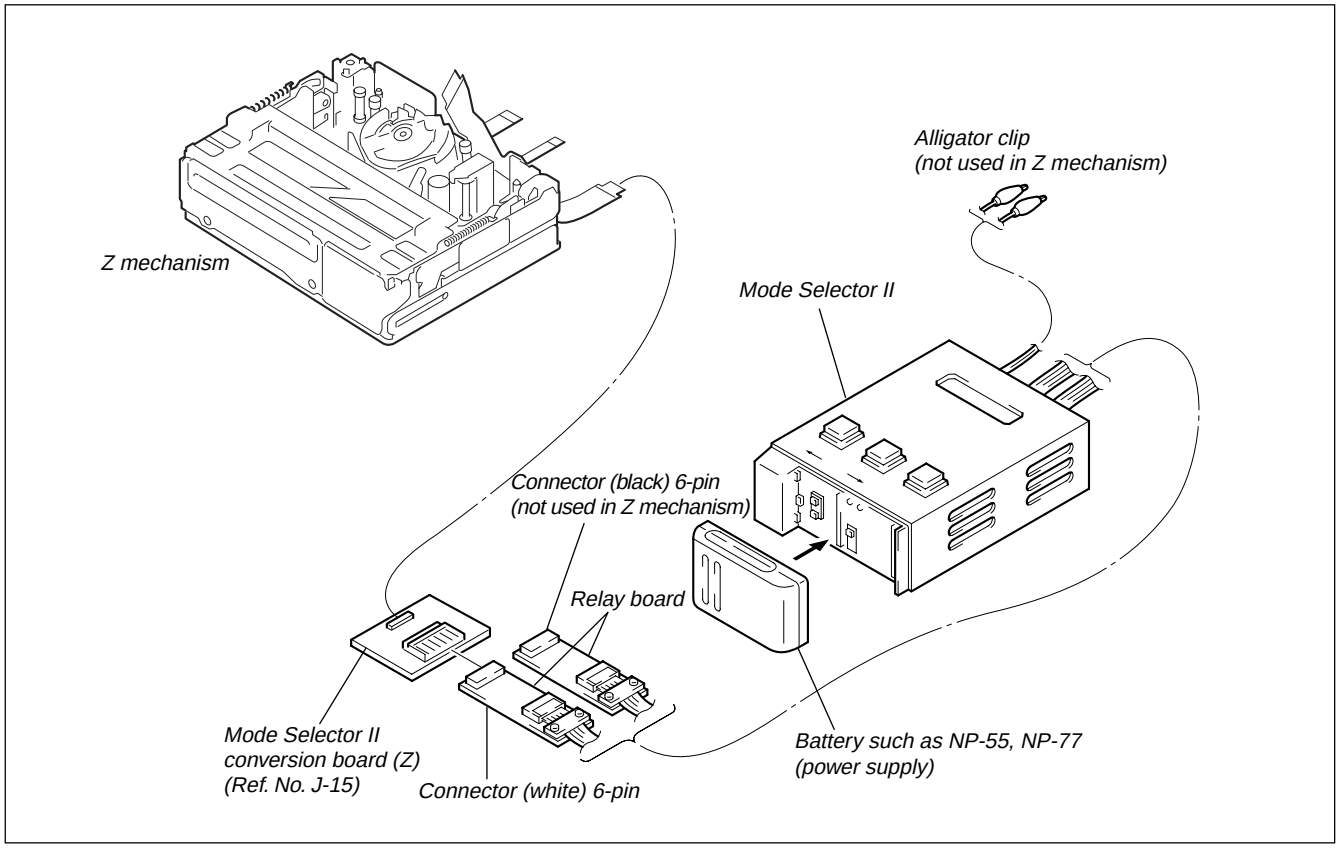
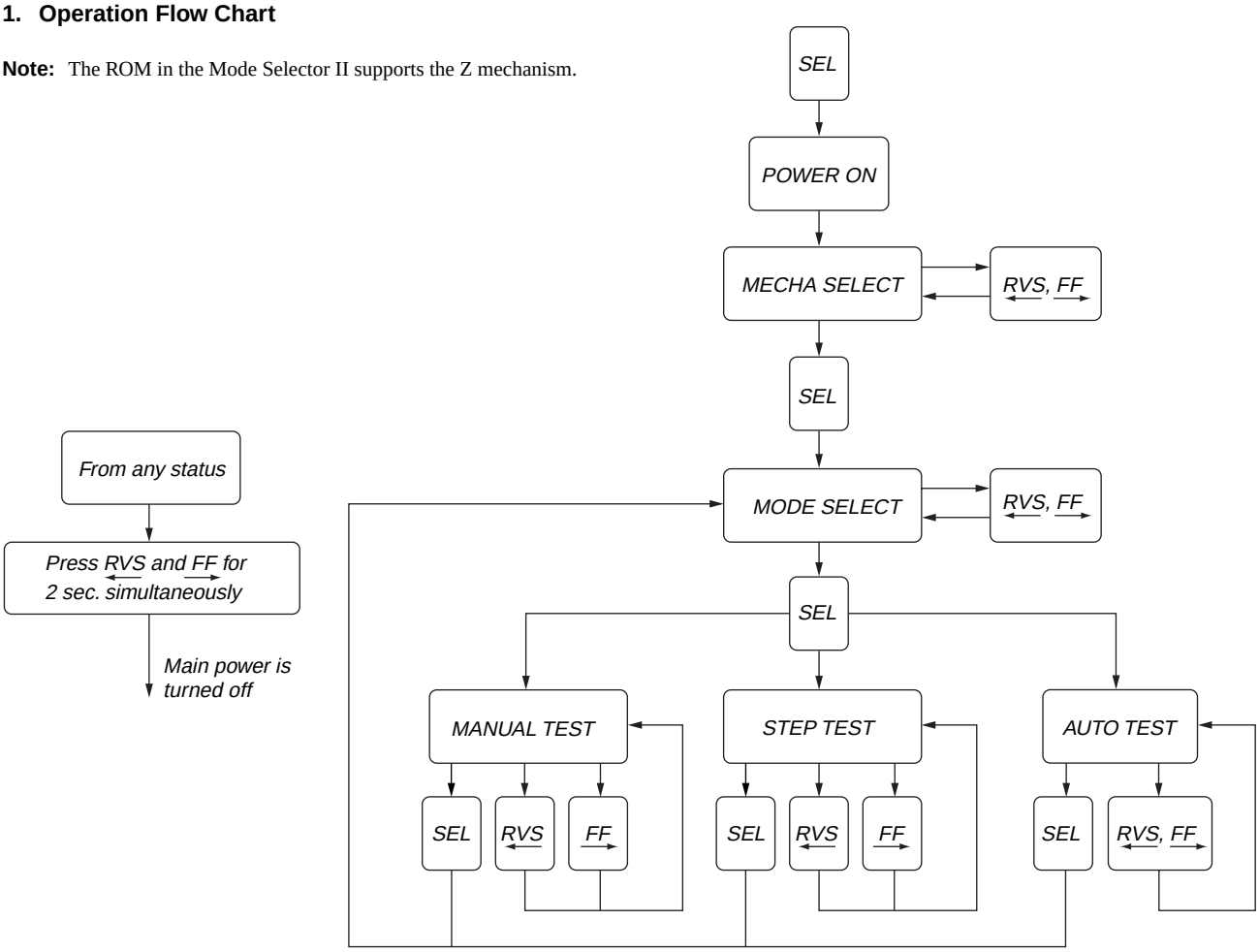


Fig. 2-4

2-5-2. Operation

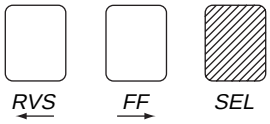
1. Operation Flow Chart

Note: The ROM in the Mode Selector II supports the Z mechanism.



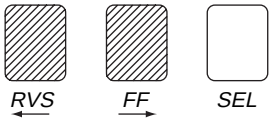
2. Mode Selector II Power On

Turn on the main power of the Mode Selector II as follows.
Press the SEL button.



3. Mode Selector II Power Off

Turn off the main power of the Mode Selector II as follows.
Press the RVS and FF buttons at the same time for 2 seconds or longer while the power is on.



4. Mecha Select

When the main power is turned on, the MECHA SELECT display appears on the LCD screen. Select the desired mechanism name using the RVS and FF buttons. Selection is complete when the SEL button is pressed. (Fig. A shows the Z mechanism.)

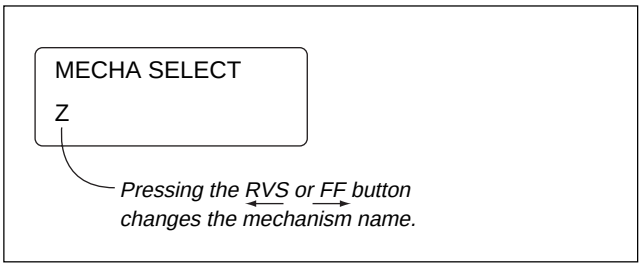


Fig. a

5. Test Type Select

Using the RVS and FF buttons, select a desired test type from the three types of "MANUAL", "STEP" and "AUTO". Selection is complete when the SEL button is pressed.

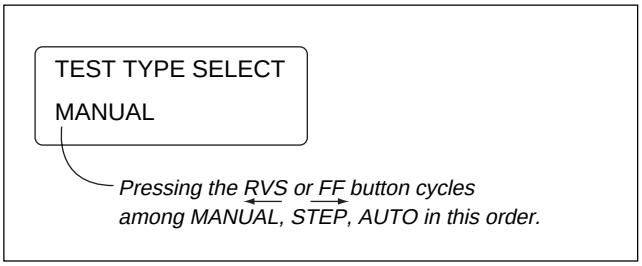


Fig. b

6. Manual Test

In this test, the motor of the mechanism deck is turned on only during the period while the RVS or FF button is pressed manually.

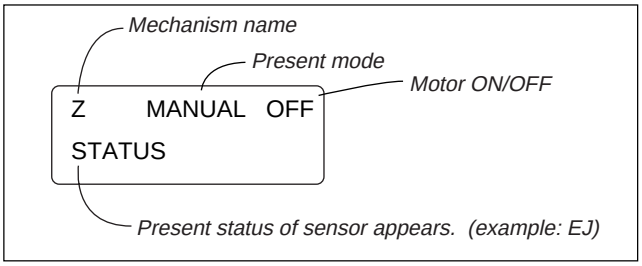


Fig. c

7. Step Test

In this test, the direction of motor movement is determined by the RVS and FF buttons. The motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information.

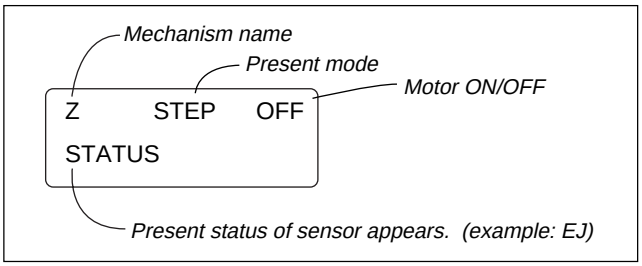


Fig. d

8. Auto Test

In this test, the mechanism deck is tested as to whether it performs a series of movements correctly in accordance with the operation sequence that is memorized earlier for each type of deck, by checking the output signals from sensors with the stored memory. Turning on the RVS or FF button performs the same operation.

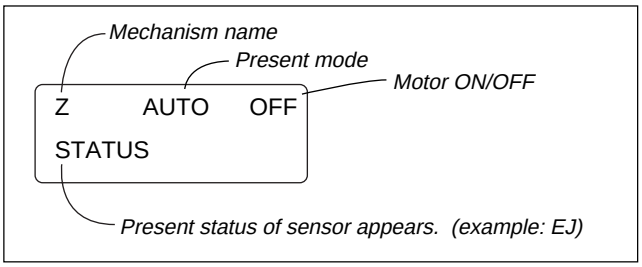


Fig. e

2-5-3. Mechanism Status (Position) Transition Table Using Mode Selector II

After selecting a mechanism deck, select either the MANUAL or STEP test (not AUTO) using the Mode Selector II. The desired mechanism status (position) can be specified by pressing the RVS or FF button. (The selected status appears on STATUS.)
EJ⟷ULE⟷SR⟷HL⟷STOP⟷R/P

MD name / Code				Z Mechanism
A	B	C		
0	1	0	1	EJ
1	1	0	2	ULE
1	0	0	3	SR
1	0	1	4	HL
0	0	1	5	STOP
0	1	1	6	R/P

2-5-4. Battery Alarm Indication

When the level of the battery used to supply power to this system decreases, this display appears asynchronously. When this happens, all operations are disabled and the battery must be replaced.

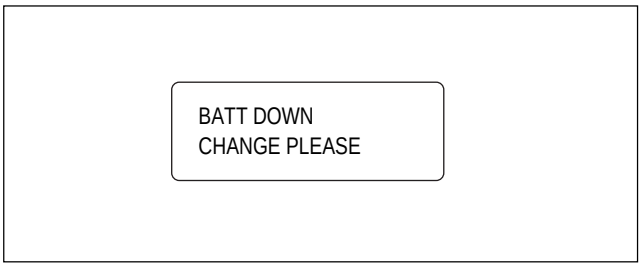
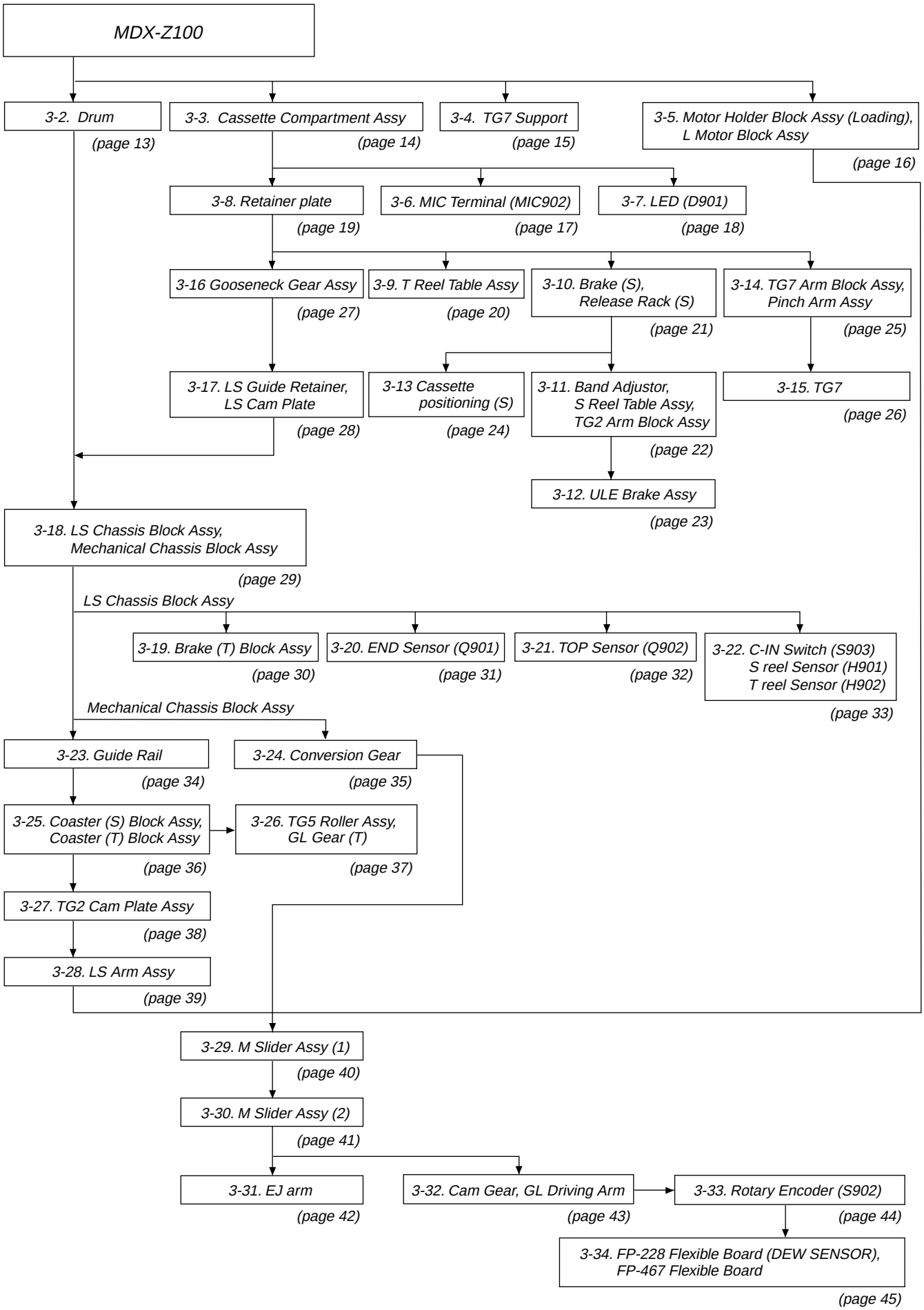


Fig. f

3. Check, Adjustment and Replacement of Mechanical Parts

3-1. Flowchart of Replacement of Mechanical Parts



3-2. Drum

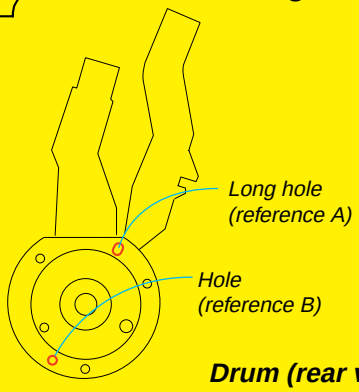
1. Removal procedure

1) Remove head drum flexible board Ⓒ from the notch of the mechanical chassis block assy.
2) Remove the drum fixing screw (M1.4 × 1.3) ① and remove the drum assy ②.

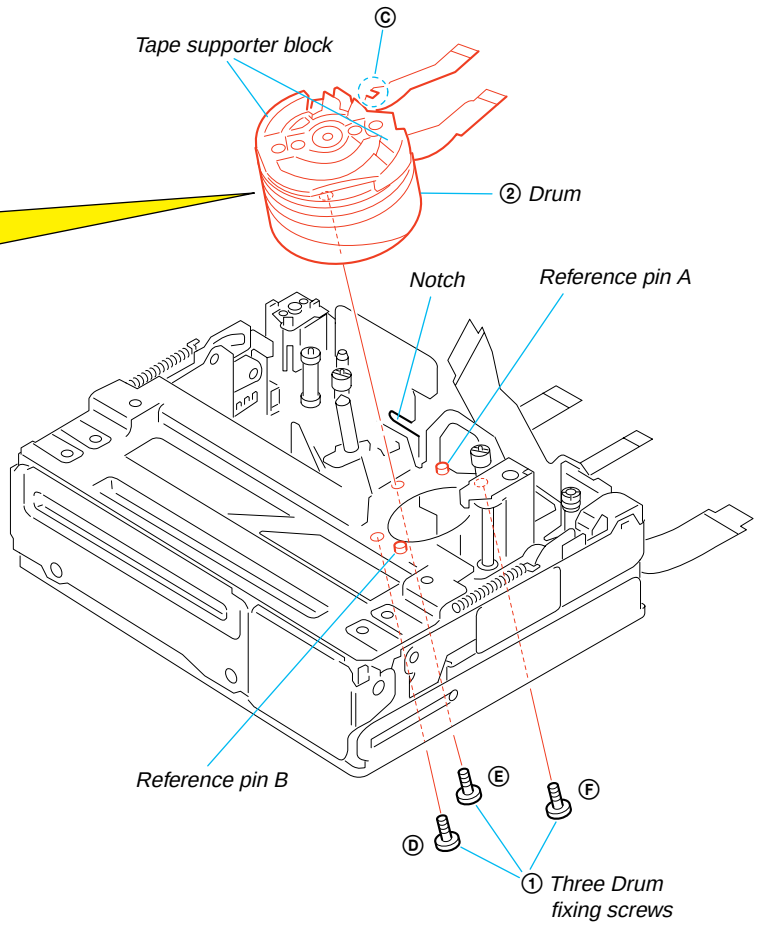
2. Attachment procedure

1) Ensure that head drum fixible board is hooked on the tape supporter block.
2) Hold the tape-supporter block of the drum ② and insert the drum flexible board into the mechanical chassis block assy.
3) Insert the two reference holes A and B of the drum into the reference pins A and B of the drum base assy.
4) Hook the flexible board Ⓒ portion on the notch.
5) Install the three drum fixing screws (M1.4 × 1.3) ① in the order starting from Ⓓ, then Ⓔ, and finally Ⓕ. Then tighten the screws.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
   Return Ⓔ 120°, then apply the screw locking paint (Neji lock).
6) Clean the drum by referring to section2-1.
7) Perform the tape path adjustment. (Refer to “4-4. Tape Path Adjustment”.)

Key Points in Re-assembling

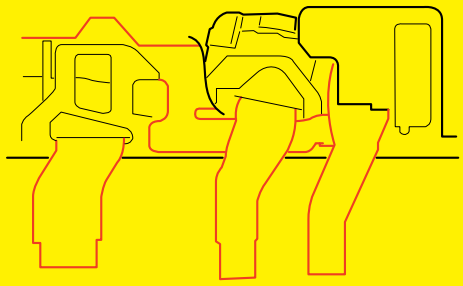


Drum (rear view)



Drum Flexible Board Processing

Key Points in Re-assembling



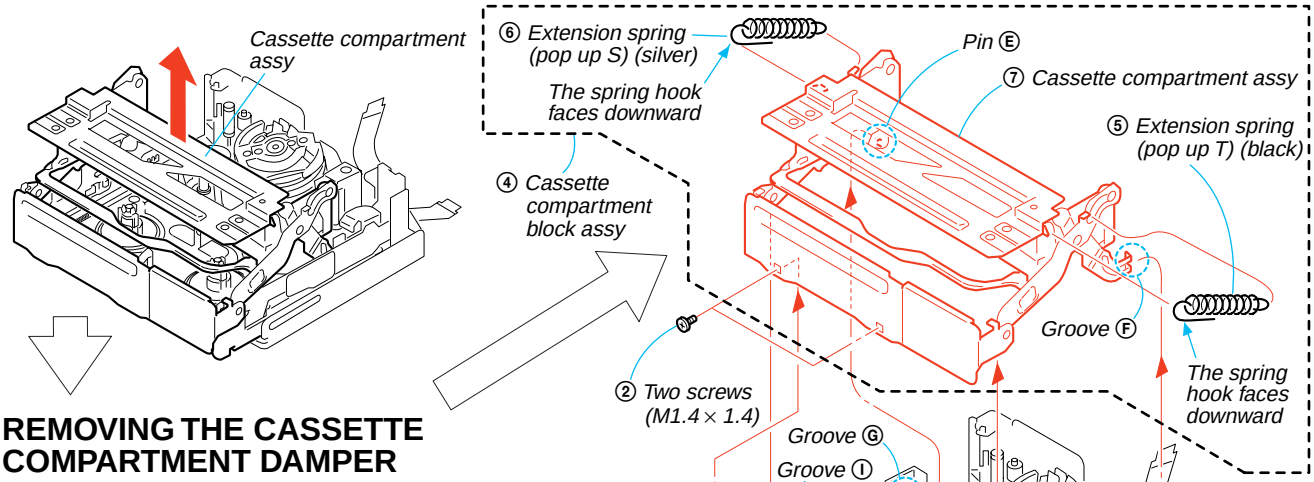
3-3. Cassette Compartment Assy

1. Removal procedure

1) Set the [EJ] mode.
2) Press the cassette compartment down halfway. Pull the cassette compartment damper ① in the direction of the arrow Ⓐ. Then rotate it in the Ⓑ direction, and remove it in the direction of Ⓒ.
3) Remove the two screws (special head screw M1.4 × 1.4) ②.
4) Remove the LS chassis block assy ③ in the direction of the arrow Ⓓ.
5) Remove the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ from the LS chassis groove Ⓖ and pin Ⓗ. Then remove the cassette compartment block assy ④.
6) Remove the tension spring (POP UP T) (black) ⑤.
7) Remove the tension spring (POP UP S) (silver) ⑥.Then remove the cassette compartment assy ⑦.

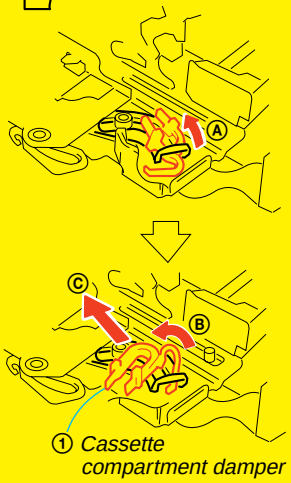
2. Attachment procedure

1) Set the [ULE] mode.
2) Install the tension spring (cassette compartment S) (POP UP S) (silver) ⑥ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
3) Install the tension spring (cassette compartment T) (POP UP T) (black) ⑤ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
4) Install the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ into the LS chassis groove Ⓖ and pin Ⓗ.
5) In the status that the LS block assy ③ is kept open, insert it into the grooves Ⓘ and Ⓙ of the LS chassis block assy.
6) Close the LS chassis block assy ③ in the direction opposite to the arrow Ⓓ, and install it with the two screws (special head screw M1.4 × 1.4) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) The cassette compartment down halfway. Pass the Ⓚ portion of the cassette compartment damper ① through the groove at the tip of the cassette compartment. Then pull the Ⓛ portion and fix it using tweezers or something.

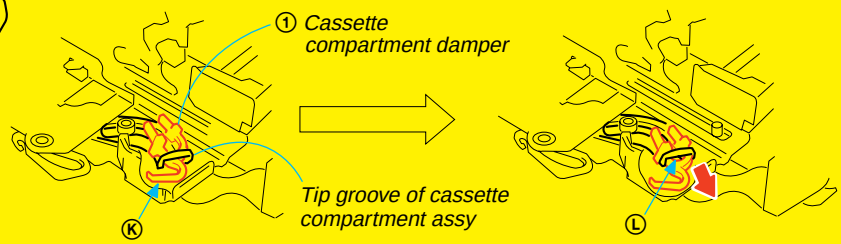


REMOVING THE CASSETTE COMPARTMENT DAMPER

Points to be noted



Key Points in Re-assembling



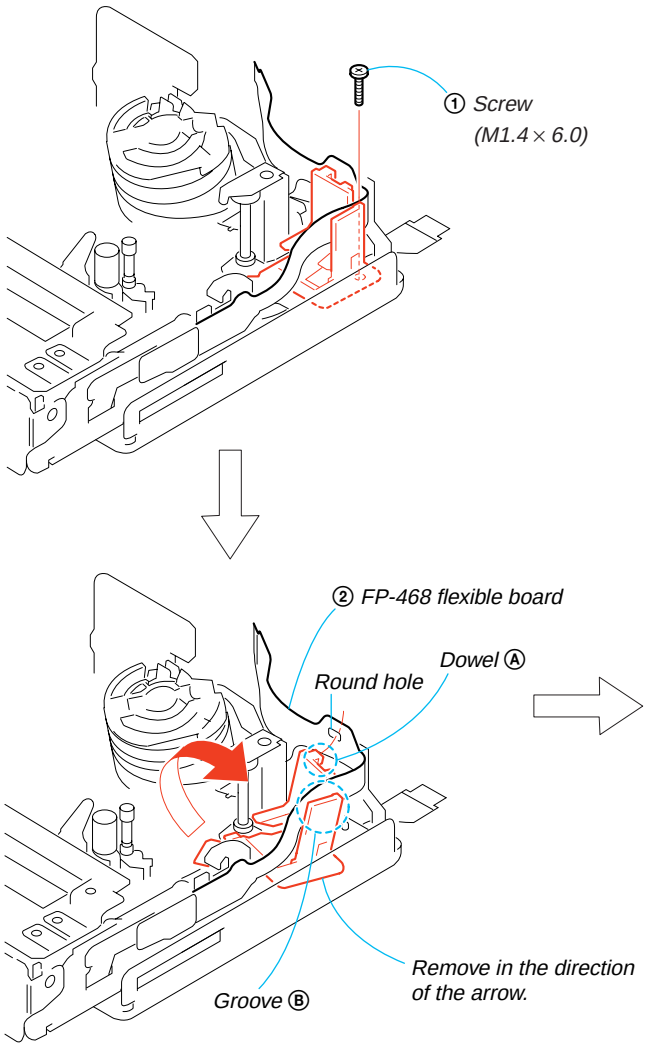
3-4. TG7 Support

1. Removal procedure

1) Remove the screw (special head screw M1.4 × 6.0) ①.
2) Remove the FP-468 flexible board ② from the dowel Ⓐ of the TG7 support.
3) Remove the FP-468 flexible board ② from the groove Ⓑ of the TG7 support.
4) Remove the TG7 support ③ in the direction of the arrow.

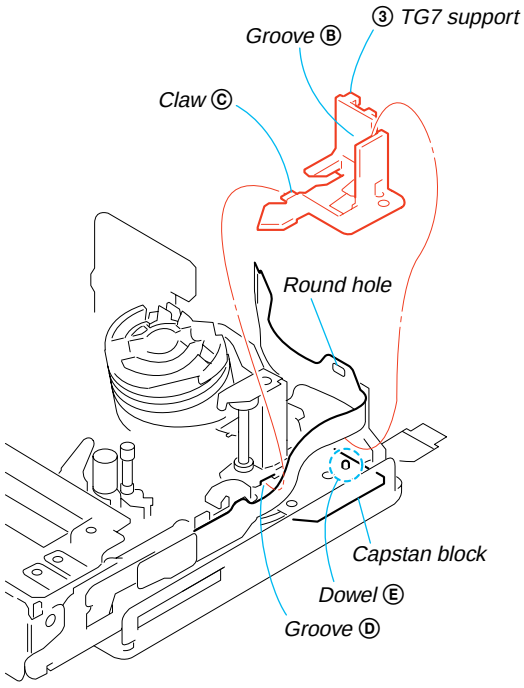
2. Attachment procedure

1) Install the FP-468 flexible board ② into the groove Ⓑ of TG7 support ③.
2) Insert the claw Ⓒ of the TG7 support ③ into the groove Ⓓ of the capstan block, and fix it while aligning with the dowel Ⓔ.
3) Align the round hole of the FP-468 flexible board ② with the dowel Ⓐ of the TG7 support ③.
4) Install the screw (special head screw M1.4 × 6.0) ①.
Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



Points to be noted

• Be careful not to damage the FP-468 flexible board.



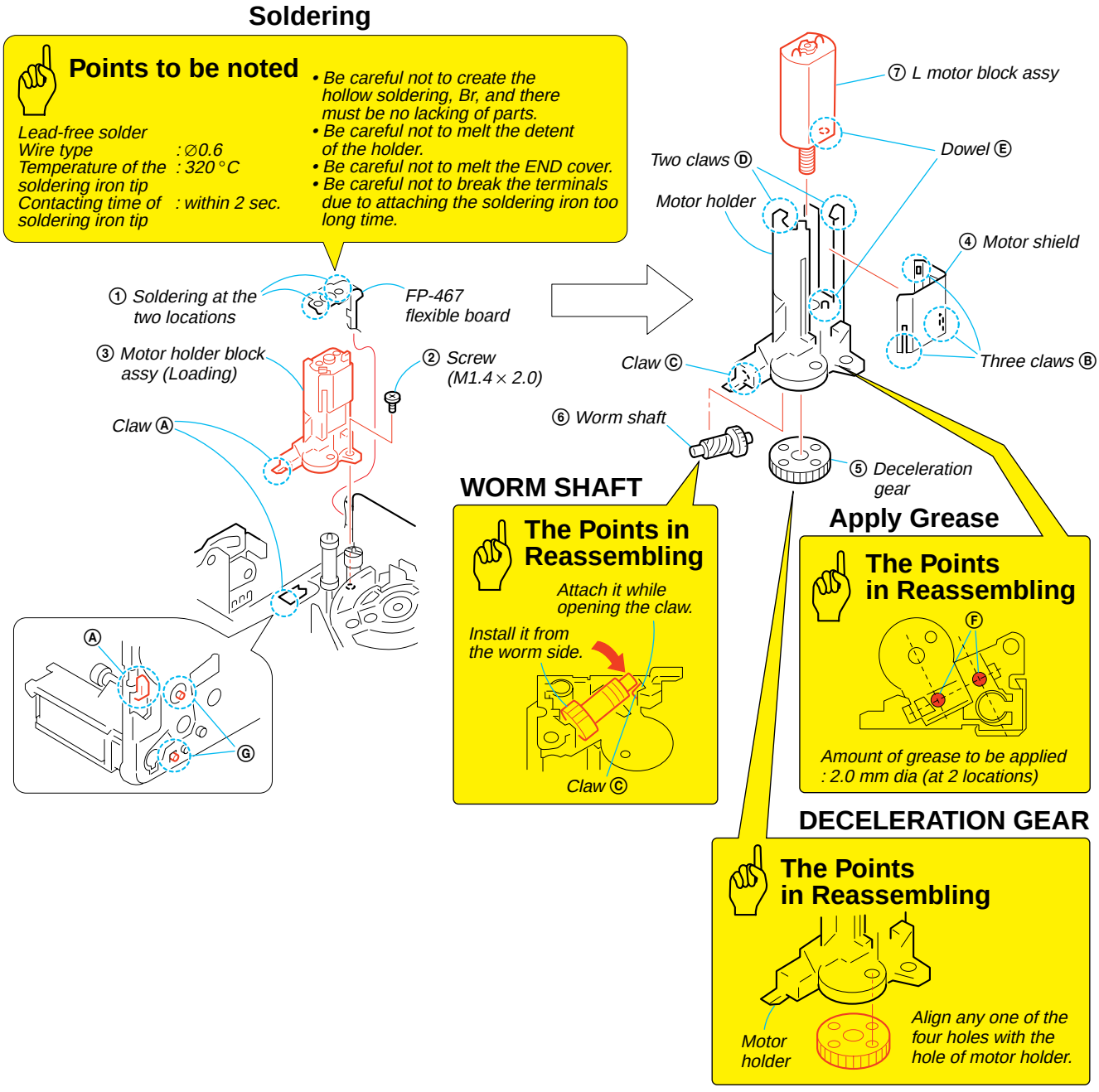
3-5. Motor Holder Block Assy and L Motor Block Assy

1. Removal procedure

1) Remove soldering at the two locations ①, and remove the FP-467 flexible board from the motor holder block assy (loading) ③.
2) Remove the screw (special head screw M1.4 × 2.0) ②.
3) Remove the motor holder block assy (loading) ③ by pulling it off from the claw Ⓐ.
4) Release the three claws Ⓑ and remove the motor shield ④.
5) Remove the deceleration gear ⑤.
6) Release the claw Ⓒ and remove the worm shaft ⑥.
7) Release the two claws Ⓓ and remove the L motor block assy ⑦ from the motor holder.

2. Attachment procedure

1) Confirm the direction of the L motor block assy ⑦. Align the dowels Ⓔ then install into the motor holder. (Insert the motor worm so that the motor worm does not touch the motor holder, and fix it with two claws Ⓓ.
2) Engage the three claws Ⓑ and install the motor shield.
3) Apply 2.0 g of grease (at 2 locations) to the bottom Ⓕ of the motor holder.
4) Install the worm shaft ⑥ from the worm side and set the claw.
5) Install the reduction gear ⑤.
6) Engage the claw Ⓐ and align the two dowels Ⓖ. Then install the motor holder block assy (loading) ③ in the mechanical chassis block. Install the screw (special head screw M1.4 × 2.0) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) Make soldering at the two locations ①. Install the motor holder block assy (loading) ③ into the FP-467 flexible board ④.


Soldering
Points to be noted
Lead-free solder
Wire type : ∅0.6
Temperature of the soldering iron tip : 320 °C
Contacting time of soldering iron tip : within 2 sec.
• Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
• Be careful not to melt the detent of the holder.
• Be careful not to melt the END cover.
• Be careful not to break the terminals due to attaching the soldering iron too long time.
① Soldering at the two locations
FP-467 flexible board
③ Motor holder block assy (Loading)
② Screw (M1.4 × 2.0)
Claw Ⓐ
Ⓐ
Ⓖ
⑦ L motor block assy
Two claws Ⓓ
Dowel Ⓔ
Motor holder
④ Motor shield
Three claws Ⓑ
Claw Ⓒ
⑥ Worm shaft
⑤ Deceleration gear
WORM SHAFT
The Points in Reassembling
Attach it while opening the claw.
Install it from the worm side.
Claw Ⓒ
Apply Grease
The Points in Reassembling
Ⓕ
Amount of grease to be applied : 2.0 mm dia (at 2 locations)
DECELERATION GEAR
The Points in Reassembling
Motor holder
Align any one of the four holes with the hole of motor holder.

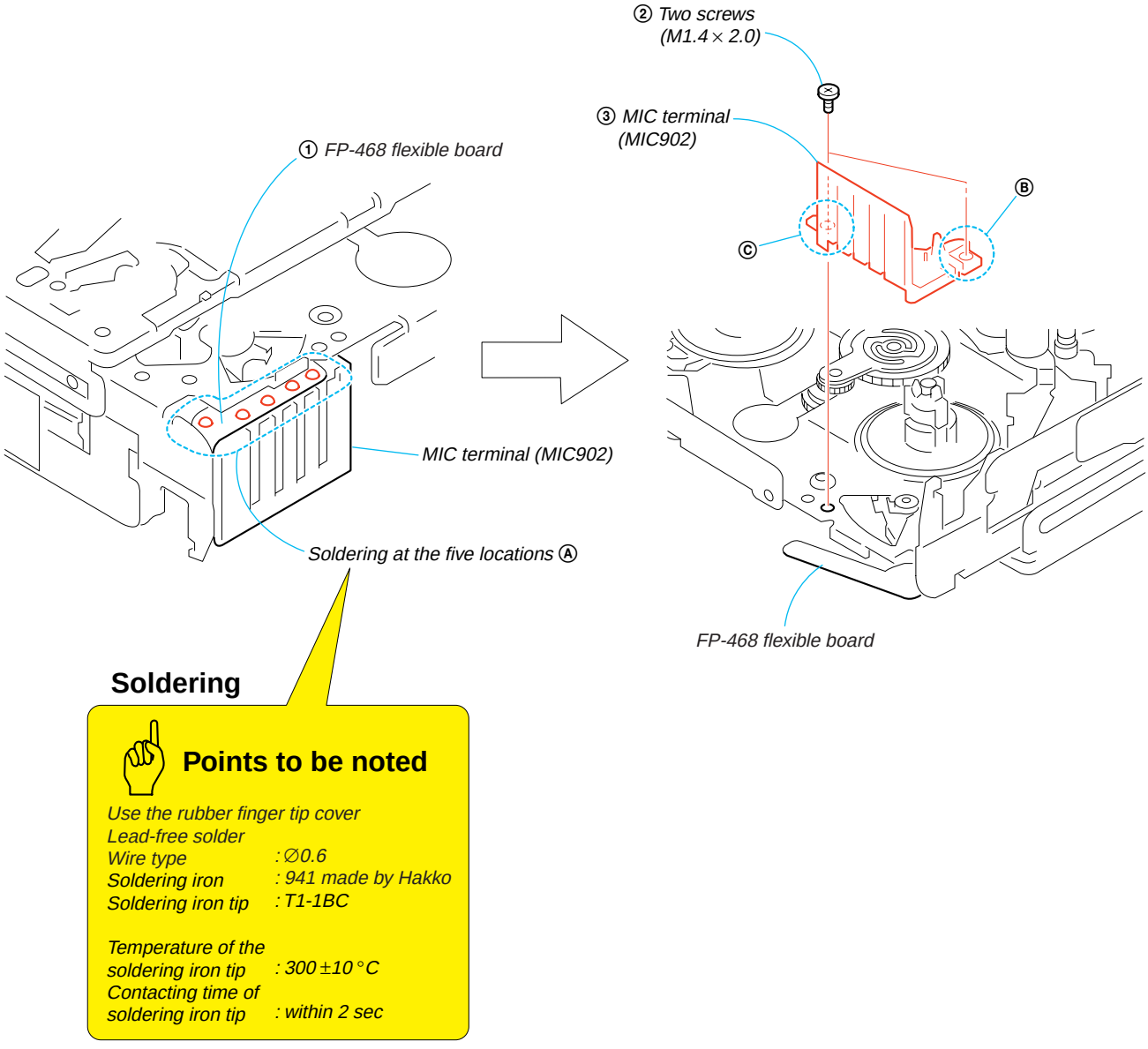
3-6. MIC Terminal (MIC902)

1. Removal procedure

1) Remove soldering at the five locations Ⓐ, and remove the FP-467 flexible board ① from the MIC terminal (MIC902) ③.
2) Remove the screw (special head screw M1.4 × 2.0) ② and remove the MIC terminal (MIC902) ③.

2. Attachment procedure

1) While pressing the top of the MIC terminal (MIC902) ③, tighten the two screws (special head screw M1.4 × 2.0) ② in the order of Ⓑ then Ⓒ.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
2) Make soldering at the five locations Ⓐ, and connect the FP-468 flexible board ① into the MIC terminal (MIC902) .



Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder

Wire type	*: ∅0.6*
Soldering iron	*: 941 made by Hakko*
Soldering iron tip	*: T1-1BC*
Temperature of the soldering iron tip	*: 300 ±10 °C*
Contacting time of soldering iron tip	*: within 2 sec*

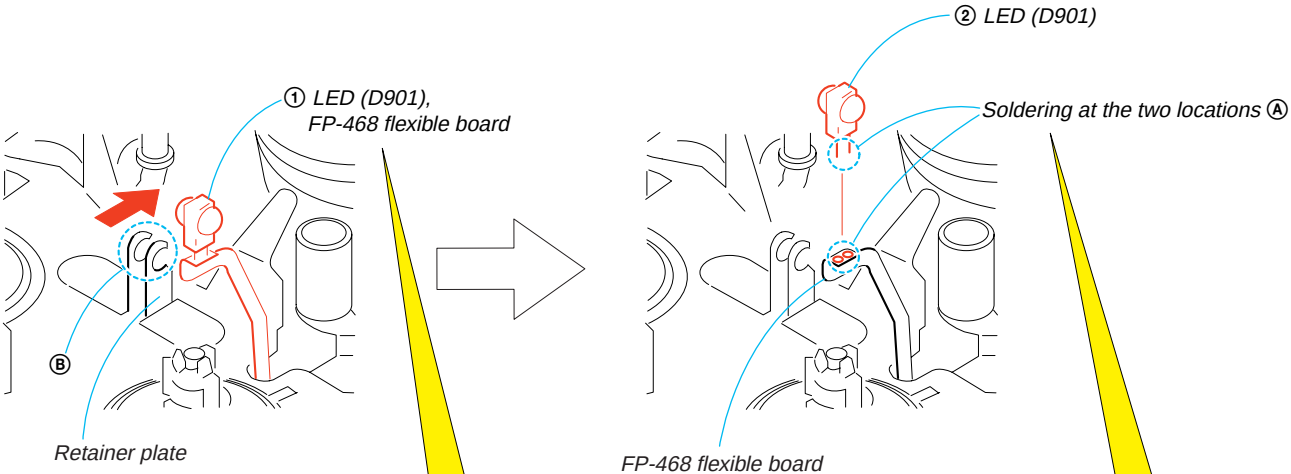
3-7. LED (D901)

1. Removal procedure

1) Remove LED (D901) and the FP-468 flexible board ① from the retainer plate.
2) Remove soldering at the two locations Ⓐ and remove LED (D901) ②.

2. Attachment procedure

1) Install the LED (D901) ② to the FP-468 flexible board by making soldering at the two locations Ⓐ.
2) Fold the FP-468 flexible board ① beneath the LED (D901) with finger tip so that it is inserted into the Ⓑ portion of the retainer plate.



LED (D901), FP-468 FLEXIBLE BOARD

Points to be noted

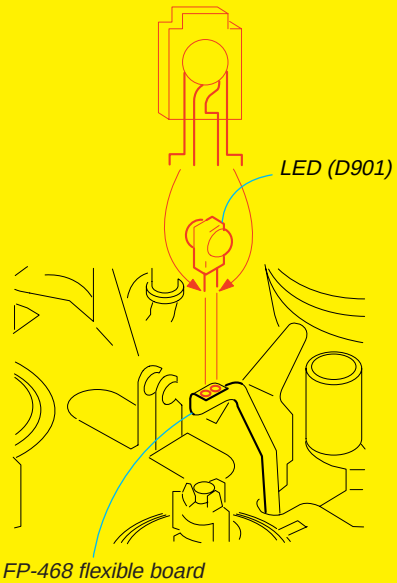
- *There must be no solder crack.*
- *There must be no scars and no stains.*
- *The flexible board must have no breakdown.*
- *The retainer plate and LED block must have no deformation.*

Soldering

Points to be noted

Rubber finger tip protection cover must be used.
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Soldering iron tip: T1-1BC
Temperature of the soldering iron tip: 300 ±10 °C
Contacting time of soldering iron tip: within 2 sec.

Direction of the terminal is specified.



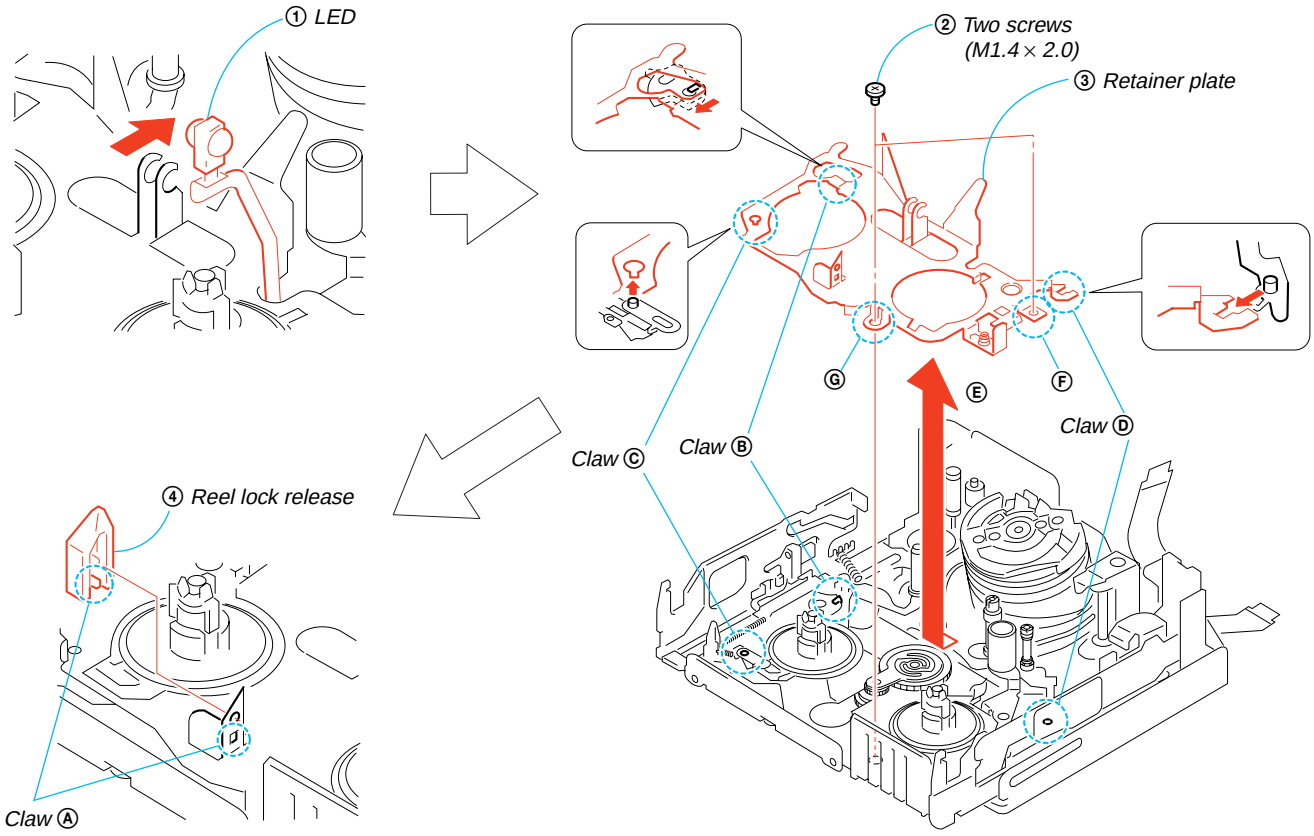
3-8. Retainer Plate

1. Removal procedure

1) Remove LED ① from the retainer plate.
2) Remove the two screws (special head screw M1.4 × 2.0) ②.
3) Release the three claws Ⓑ, Ⓒ and Ⓓ, and remove the retainer plate ③ in the direction of the arrow mark Ⓔ.
4) Release the claw Ⓐ and remove the reel lock release ④.

2. Attachment procedure

1) Install the reel lock release ④.
2) Place the retainer plate ③ on top of the LS chassis block assy and engage the three claws in the order starting from Ⓓ, Ⓒ and Ⓑ.
3) Install the two screws (special head screw M1.4 × 2.0) ② in the order starting from Ⓕ then Ⓖ.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
4) Install LED ① to the retainer plate.



REEL LOCK RELEASE

Key Points in Re-assembling

- *The reel lock release should not be re-used.*
- *The retainer plate must not have any deformation.*
- *The reel lock release should be fully installed. (Should not be left in the half-installed state.)*

RETAINER PLATE

Key Points in Re-assembling

- *All claws must be fully engaged. (Caution : No claws should be left disengaged.)*
- *The flexible board should not be pinched by anything.*
- *The retainer plate must not touch with the MIC terminal.*

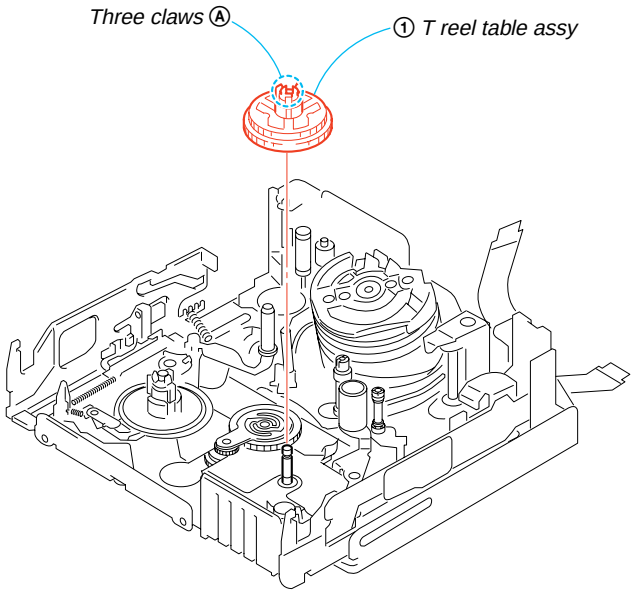
3-9. T Reel Table Assy

1. Removal procedure

1) Remove the T reel table assy ①, averting three claws Ⓐ.

2. Attachment procedure

1) Confirm that the supplied part is really the T reel table assy ①. Insert the T reel table assy ① into the T reel shaft. Install the T reel table assy ① and lock it at the position where you can hear the snapping sound. You can find the locking position by rotating the T reel table assy ①.



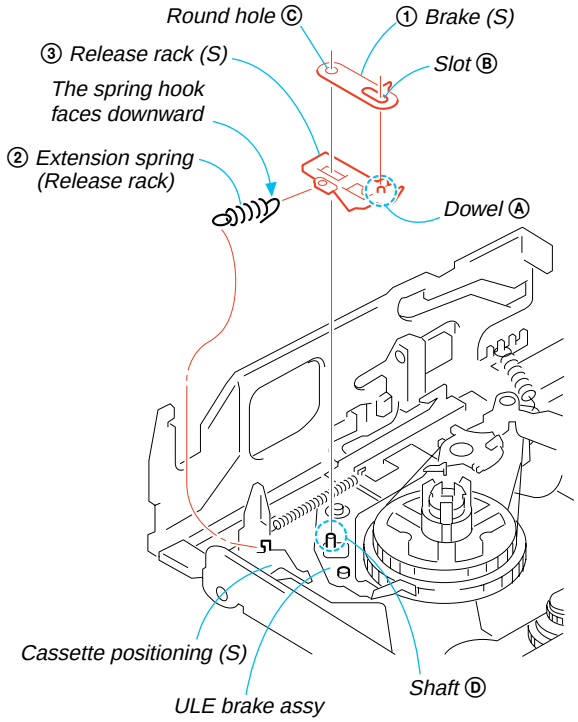
3-10. Brake (S) and Release Rack (S)

1. Removal procedure

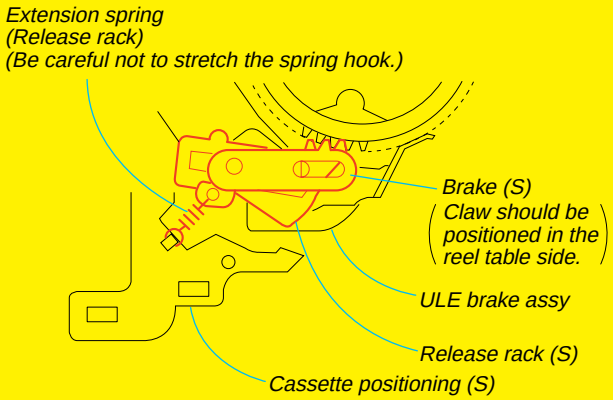
1) Remove the brake (S) ①.
2) Remove the tension spring (release rack (S)) ②.
3) Remove the release rack (S) ③.

2. Attachment procedure

1) Remove the release rack (S) ③ by holding it with a ultra precision tweezers. Install the tension spring (release rack) ② while being careful of the installation direction of the tension spring.
2) Hook the tension spring (release rack) ② on the hook of the cassette positioning (S), and then install it in the ULE brake assy.
3) Insert the slot Ⓑ in the dowel Ⓐ of the release rack (S) ③. Insert the round hole Ⓒ into the pivot shaft Ⓓ and install the brake (S) ①.
(Installation direction: Claw should be positioned in the reel table side.)



Key Points in Re-assembling


Extension spring (Release rack) (Be careful not to stretch the spring hook.)
Brake (S) Claw should be positioned in the reel table side.
ULE brake assy
Release rack (S)
Cassette positioning (S)

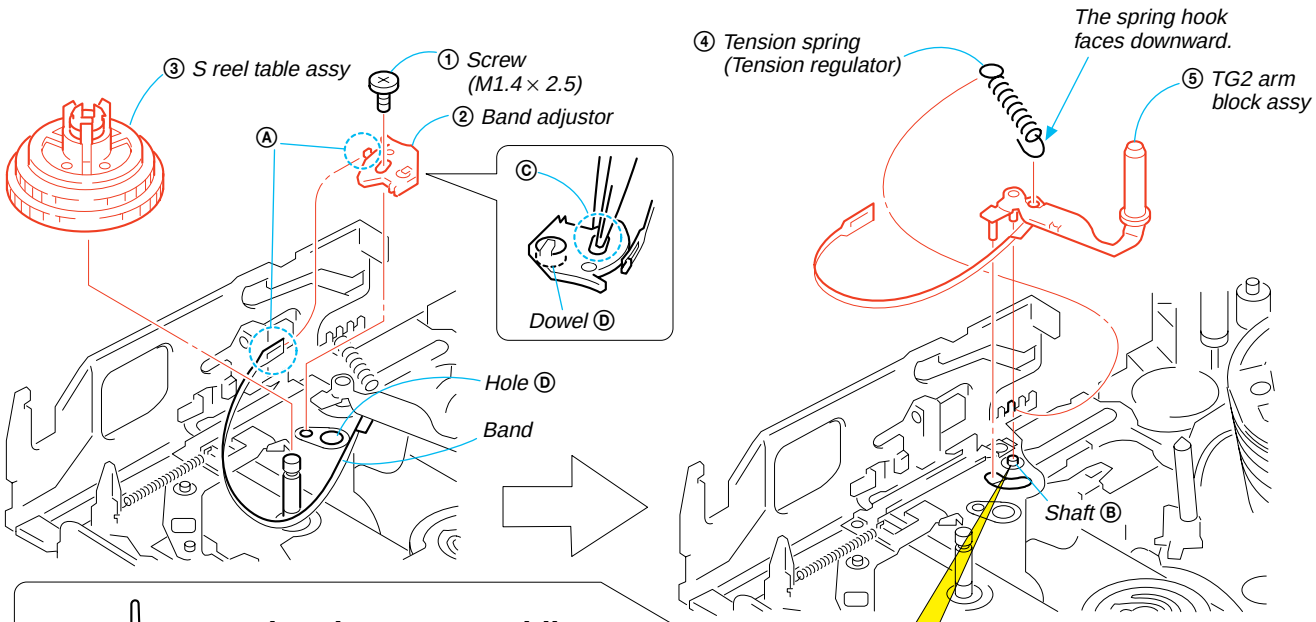
3-11. Band Adjuster, S Reel Table Assy and TG2 Arm Block Assy

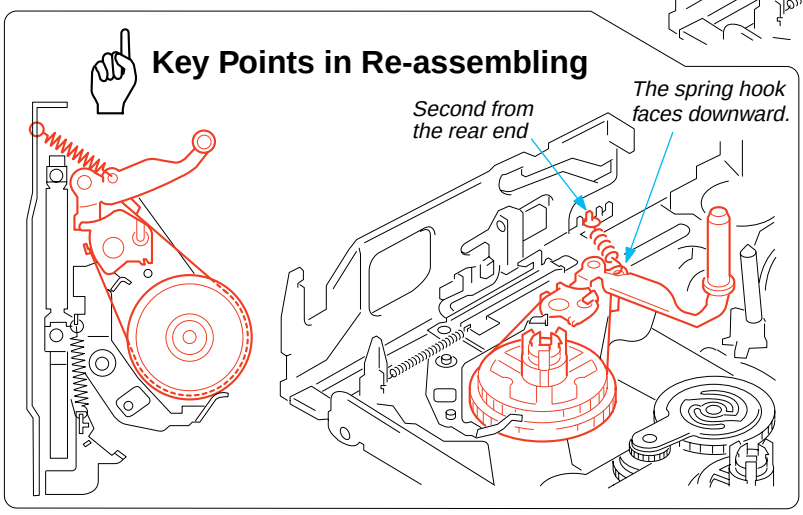
1. Removal procedure

1) Remove the screw (special head screw M1.4 × 2.5) ①.
2) Remove the band Ⓐ of the TG2 arm block and remove the band adjuster ②.
3) Remove the S reel table assy ③.
4) Remove the tension spring (tension regulator spring) ④.
5) Remove the TG2 arm block assy ⑤.

2. Attachment procedure

1) Install the S reel table assy ③.
2) Apply grease in the TG2 arm pivot shaft Ⓑ.
   Amount of grease: a ball of 1.0 mm diameter of grease
   Re-application of grease to the point which is greased already before is not necessary.
3) Hold the TG2 arm block assy ⑤ with tweezers and insert it in the TG2 arm pivot shaft Ⓑ.
4) Hook the tension spring (tension regulator spring) ④ on the TG2 arm block ⑤ with tweezers so that the hook faces downward.
5) Hook the tension spring (tension regulator spring) ④ on the LS chassis block assy (the second hook from the rear end).
6) Hook the Ⓐ portion of the band on the claw of the band adjuster ②.
7) Hold the band adjuster with tweezers as shown in Ⓒ. Insert the band into groove of the S reel table assy while rotating it, and insert the adjuster's dowel into the dowel hole Ⓓ of the LS chassis block assy.
8) Install the band adjuster ② with the screw (special head screw M1.4 × 2.5) ①.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
9) Perform the TG2 FWD Position Adjustment referring to section 4-1.
10) Perform the FWD Back-tension Adjustment referring to section 4-4.
11) Perform the Reel Torque Check referring to section 4-2.

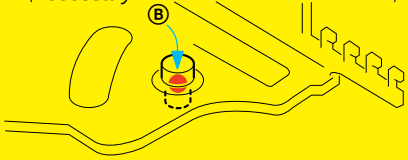




Apply Grease

Points to be noted

During installation, apply grease in the TG2 arm pivot shaft hole.
Amount of grease:
a ball of grease of 1.0 mm diameter
Re-application of grease to the point which is greased already before is not necessary.



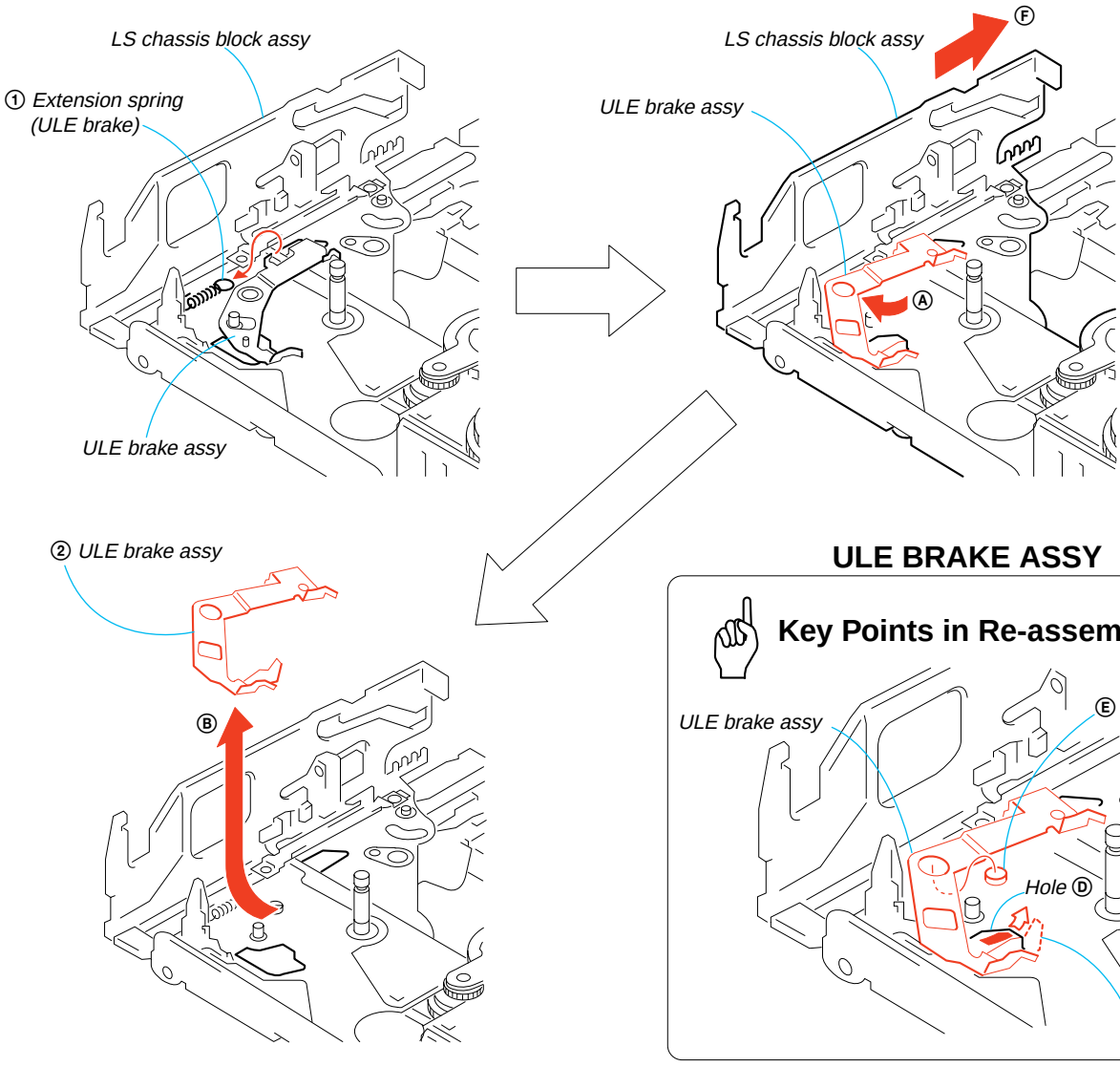
3-12. ULE Brake Assy

1. Removal procedure

1) Remove the tension spring (ULE brake) ① from the ULE brake assy ②.
2) Slide the LS chassis block assy slightly in the direction of the arrow Ⓕ.
3) Slant the ULE brake assy ② in the direction of the arrow Ⓐ and remove it by sliding it in the direction of Ⓑ.

2. Attachment procedure

1) Confirm the front side and the rear side of the ULE brake assy ②. Hold it correctly with tweezers. Insert the portion Ⓒ into the hole Ⓓ of the LS chassis block assy and install the center hole in the Ⓔ of the chassis.
2) Install the tension spring (ULE brake assy) ①.



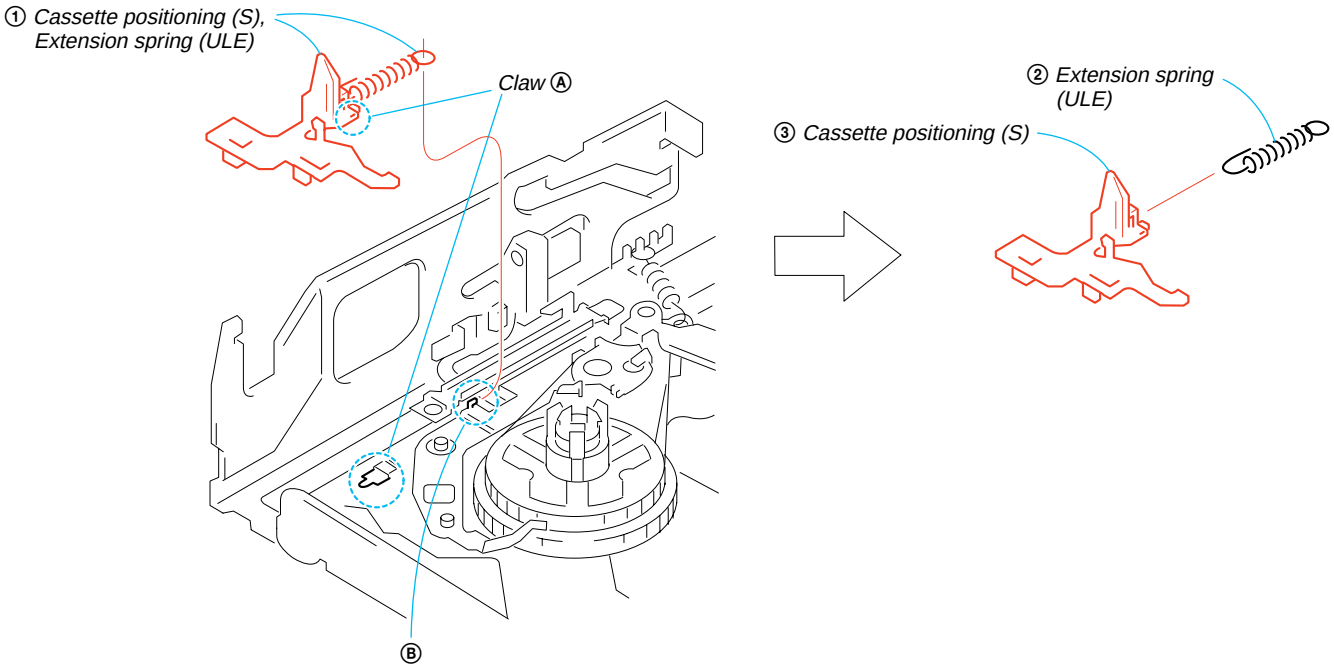
3-13. Cassette Positioning (S)

1. Removal procedure

1) Remove the tention spring (ULE brake) ② from the hook Ⓑ of ULE brake assy.
2) Slide the cassette positioning (S), then remove the cassette positioning (S) and tension spring (ULE brake) ① all together at the same time.
3) Remove the tension spring (ULE brake) ② from the cassette positioning (S) ③.

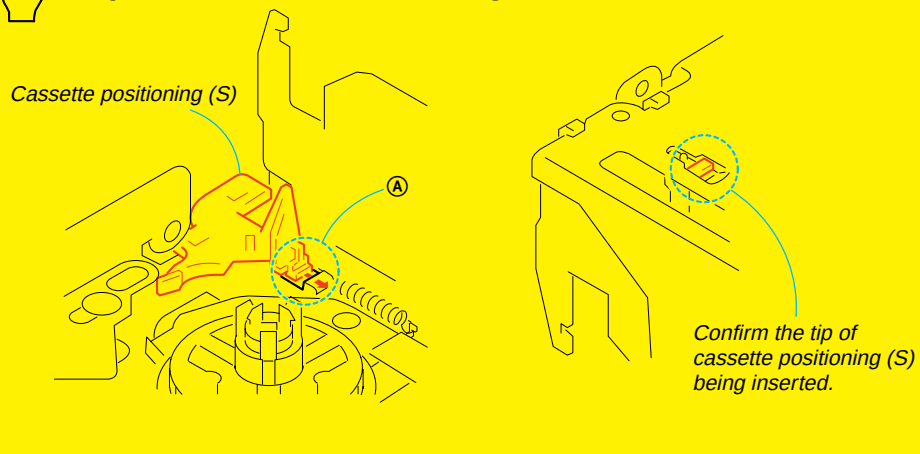
2. Attachment procedure

1) Hook the tension spring (ULE brake) ② on the cassette positioning (S) ③ with tweezers.
2) Hold the cassette positioning (S) ③ with tweezers and insert the top tip of the claw into the LS chassis block assy Ⓐ. Lock it by sliding it in.
3) Install the other end of the tension spring (ULE brake) ② on the hook Ⓑ.



CASSETTE POSITIONING (S)

Key Points in Re-assembling



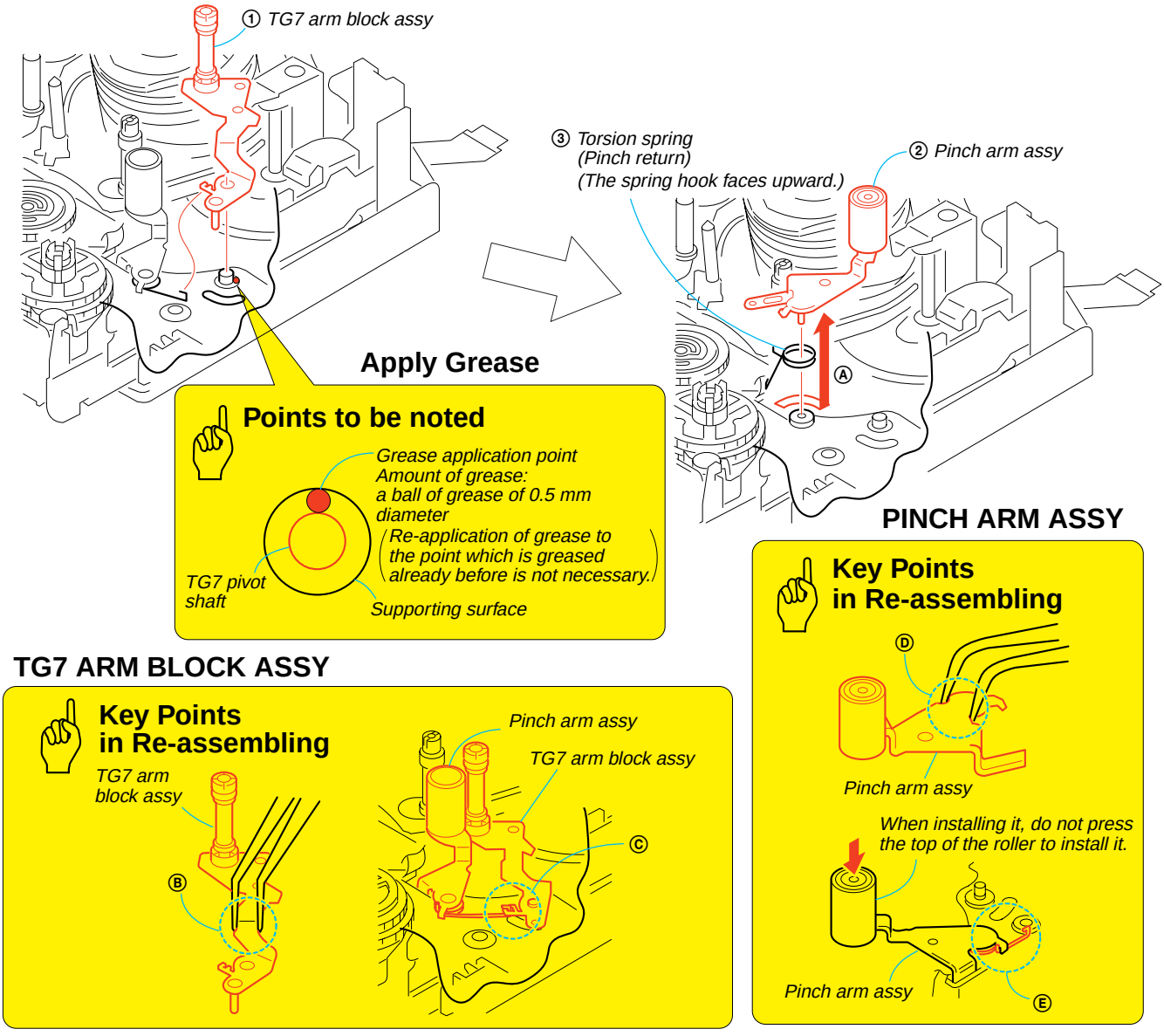
3-14. TG7 Arm Block Assy and Pinch Arm Assy

1. Removal procedure

1) Remove the TG7 arm block assy ①.
2) Rotate the pinch arm assy ② in the direction of the arrow Ⓐ and remove it.
3) Remove the torsion spring (pinch return) ③.

2. Attachment procedure

1) Hold the torsion spring (pinch return) ③ with tweezers. Confirm that the hook faces upward and install it in the bearing.
2) Hold the pinch arm assy ② as shown in Ⓓ and install it in the pinch arm bearing.
3) Hold the torsion coil spring (pinch return) ③ with tweezers and install it as shown in Ⓔ.
4) Apply grease on the supporting surface of the TG7 pivot shaft.
   Amount of grease: a ball of grease of 0.5 mm diamte
   Re-application of grease to the point which is greased already before is not necessary.
5) Hold the TG7 arm block assy ① as shown in Ⓑ and insert it in the pivot shaft of the TG7 arm.
6) Hold the torsion spring (pinch return) ③ with tweezers and install it on the hook of the TG7 arm block assy ① as shown in Ⓒ.
7) Confirm that the torsion spring (pinch return) ③ does not override on the pinch supporting shaft.



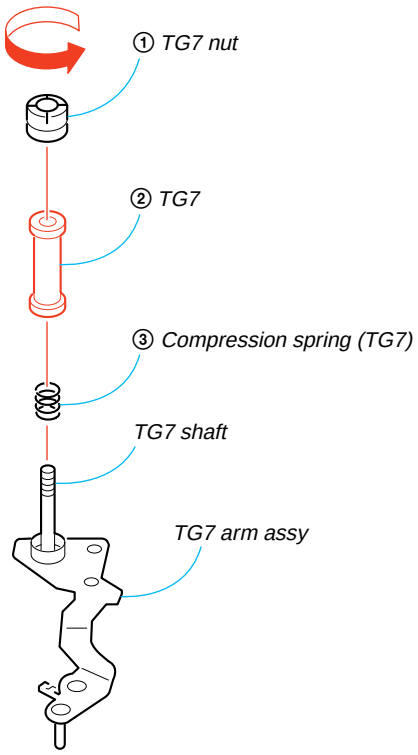
3-15. TG7

1. Removal procedure

1) Remove the TG7 nut ① by turning it in the direction of the arrow.
2) Remove the TG7 ② and compression coil spring ③ from the TG7 arm block assy.

2. Attachment procedure

1) Install the compression coil spring ③ and TG7 ② in the TG7 shaft of the TG7 arm block assy.
2) Install the TG7 nut ① by turning it in the opposite direction of the arrow.



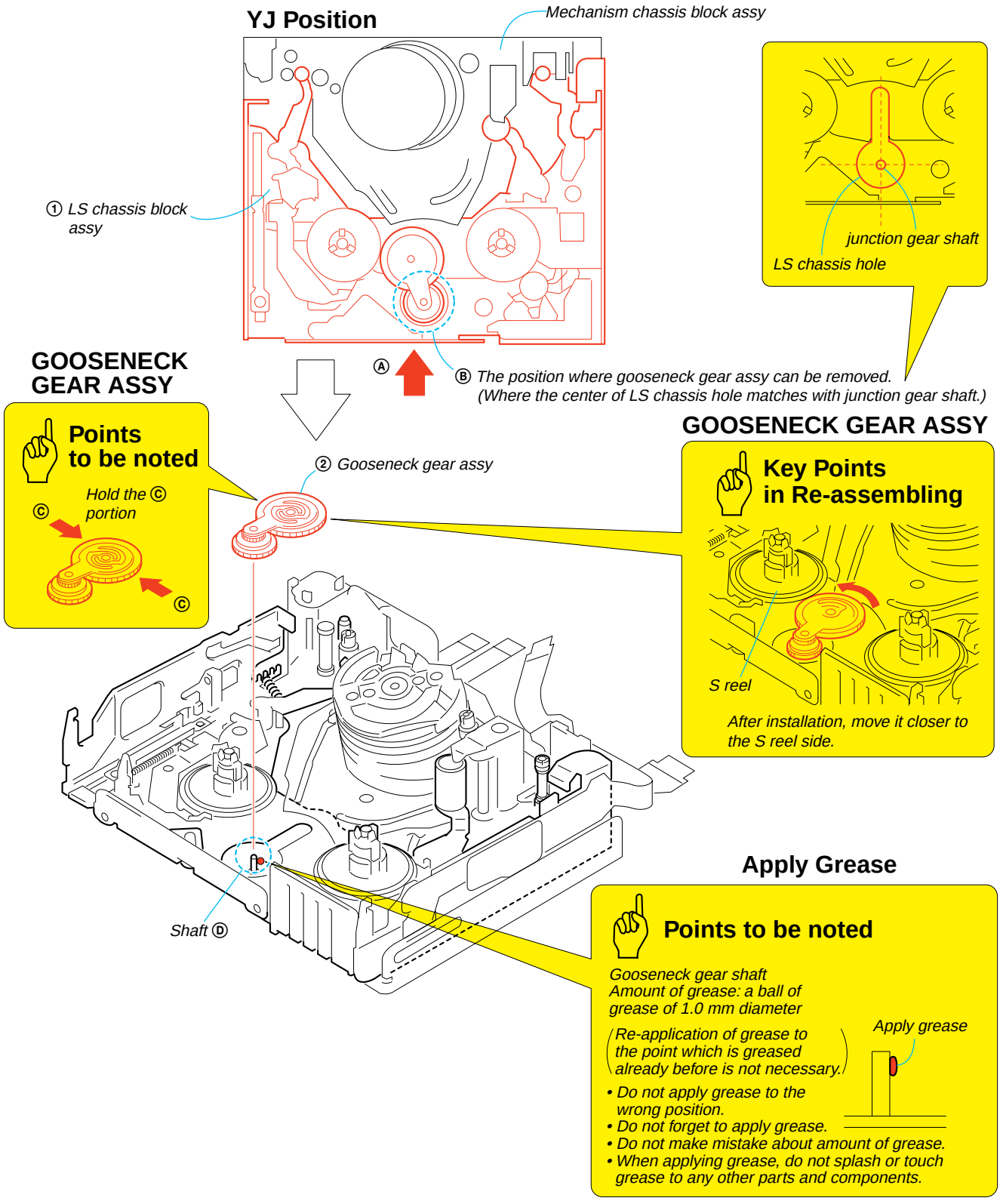
3-16. Gooseneck Gear Assy

1. Removal procedure

1) Move the LS chassis block assy ① in the direction of the arrow Ⓐ to make it in YJ position.
   YJ position: The position Ⓑ where gooseneck gear assy can be removed. (where the center of LS chassis hole matches with junction gear shaft.)
2) Remove the gooseneck gear assy, holding it with Ⓒ.

2. Attachment procedure

1) Apply grease to the gooseneck gear shaft Ⓓ portion.
   Amount of grease: a ball of grease of 1.0 mm diameter
   Need no re-application to one which applied already.
2) Install the gooseneck gear assy, holding it with Ⓒ in the gooseneck gear shaft.
3) Move it closer to the S reel.


YJ Position
Mechanism chassis block assy
① LS chassis block assy
junction gear shaft
LS chassis hole
Ⓐ
Ⓑ The position where gooseneck gear assy can be removed.
(Where the center of LS chassis hole matches with junction gear shaft.)
GOOSENECK GEAR ASSY
Points to be noted
Hold the Ⓒ portion
Ⓒ
Ⓒ
② Gooseneck gear assy
GOOSENECK GEAR ASSY
Key Points in Re-assembling
S reel
After installation, move it closer to the S reel side.
Shaft Ⓓ
Apply Grease
Points to be noted
Gooseneck gear shaft
Amount of grease: a ball of grease of 1.0 mm diameter
Re-application of grease to the point which is greased already before is not necessary.
Apply grease
• Do not apply grease to the wrong position.
• Do not forget to apply grease.
• Do not make mistake about amount of grease.
• When applying grease, do not splash or touch grease to any other parts and components.

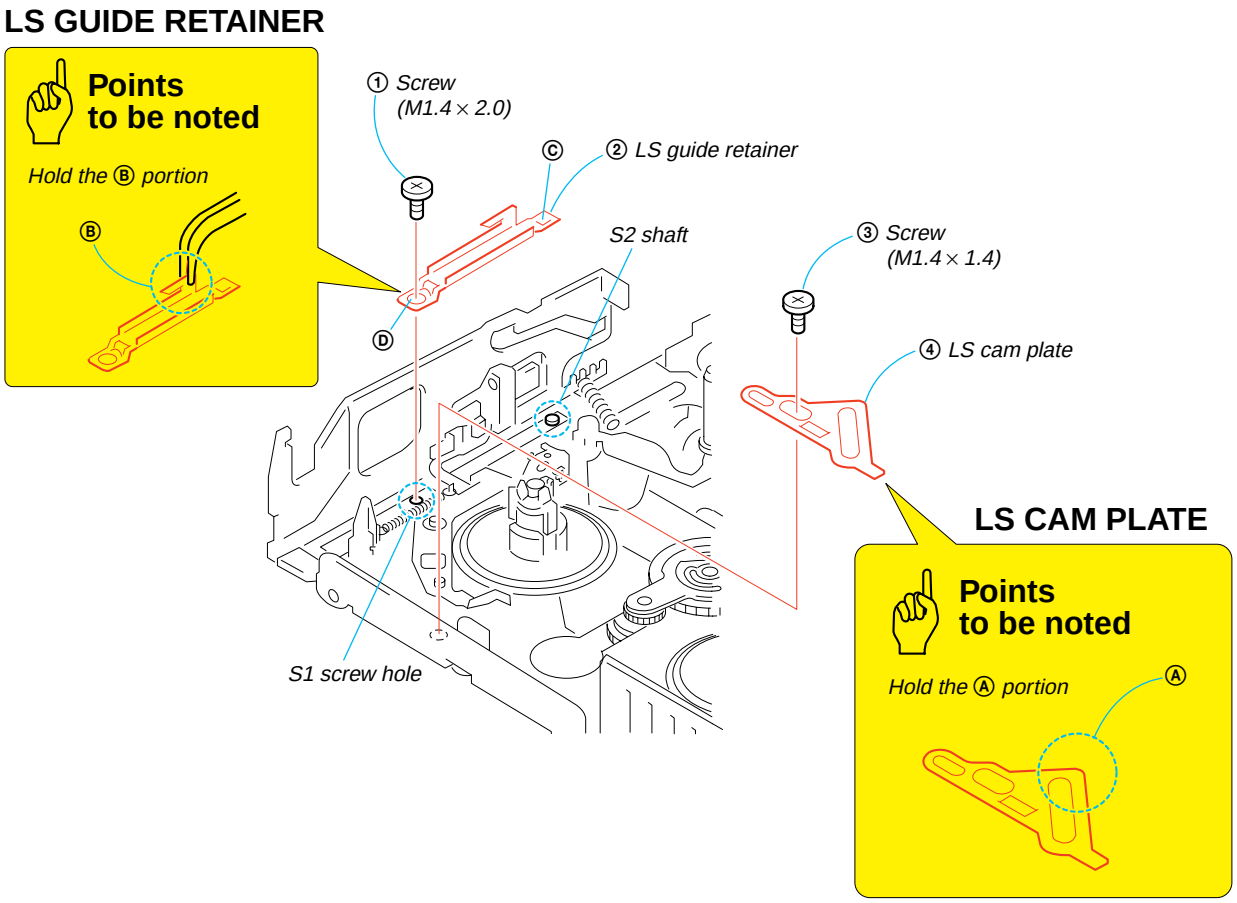
3-17. LS Guide Retainer and LS Cam Plate

1. Removal procedure

1) Remove the screw (special head screw M1.4 × 2.0) ①. and remove the LS guide retainer ②.
2) Remove the screw (special head screw M1.4 × 1.4) ③ and remove the LS cam plate ④.

2. Attachment procedure

1) Hold the LS cam plate with Ⓐ and place it aligning the two dowels. Tighten the screw (special head screw M1.4 × 1.4) ③ in half way.
2) Adjust the LS cam plate by referring to section 4-5.
3) Hold the LS guide retainer ② with Ⓑ and hook its key hole Ⓒ on the S2 shaft, and align the hole Ⓓ to S1 screw hole.
4) Install the screw (special head screw M1.4 × 2.0) ① in the S1 screw hole.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



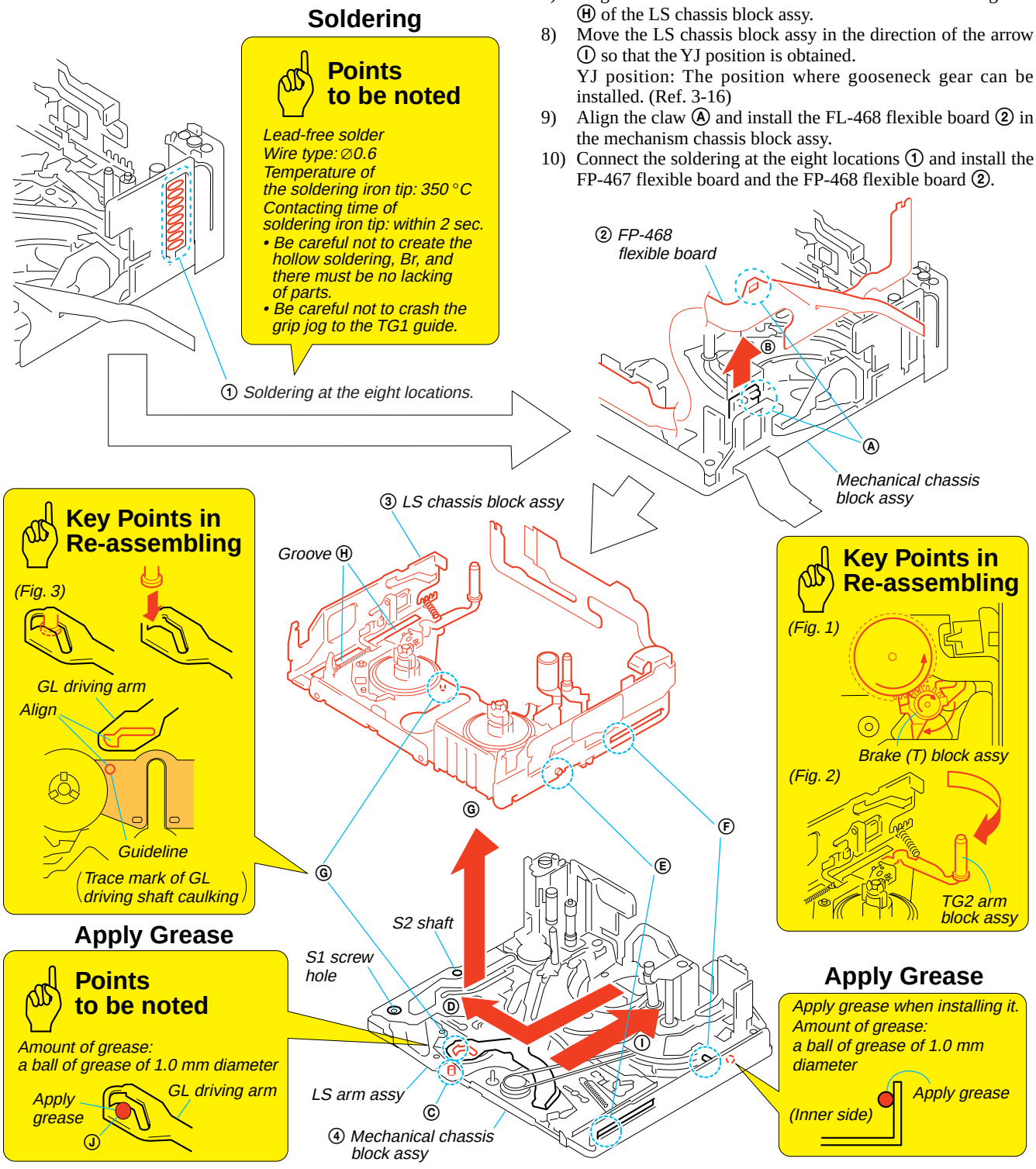
3-18. LS Chassis Block Assy and Mechanical Chassis Block Assy

1. Removal procedure

1) Remove soldering at the eight locations ①.
2) Release the claw Ⓐ and remove the FP-468 flexible board ② from the mechanical chassis block assy in the direction of the arrow Ⓑ.
3) Raise the front portion of the LS chassis block assy ③ so that the pin Ⓒ of the LS arm assy is removed. Move the LS chassis block assy ③ in the direction of the arrow Ⓓ and release the three pins of Ⓔ, Ⓕ and Ⓖ, and also groove.
4) Remove the LS chassis block ④ from the mechanical chassis block assy.

2. Attachment procedure

1) Apply grease to the GL drive arm Ⓙ portion and mechanism chassis block L.
   Amount of grease: a ball of grease of 1.0 mm diameter
2) Rotate the T reel table assy in the counter-clockwise direction and move the brake T block to the position shown in Fig. 1. (Fig. 1)
3) Move the TG2 arm block to the inner side. (Fig. 2)
4) Hold the cam groove of the GL driving arm with tweezers through LS chassis hole Ⓚ and pick it up.
5) Insert the GL drive shaft into the cam groove of the raised GL drive arm using the trace mark of caulking on the side of the S reel of the LS chassis block assy. (Fig. 3)
6) Align the pins Ⓔ, Ⓕ and Ⓖ with the grooves.
7) Align the left side S1 screw hole and S2 shaft with the goove Ⓗ of the LS chassis block assy.
8) Move the LS chassis block assy in the direction of the arrow Ⓘ so that the YJ position is obtained.
   YJ position: The position where gooseneck gear can be installed. (Ref. 3-16)
9) Align the claw Ⓐ and install the FL-468 flexible board ② in the mechanism chassis block assy.
10) Connect the soldering at the eight locations ① and install the FP-467 flexible board and the FP-468 flexible board ②.



3-19. Brake (T) Block Assy

1. Removal procedure

1) Hold the Ⓐ portion and remove the brake (T) block assy ①.

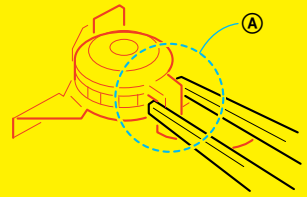
2. Attachment procedure

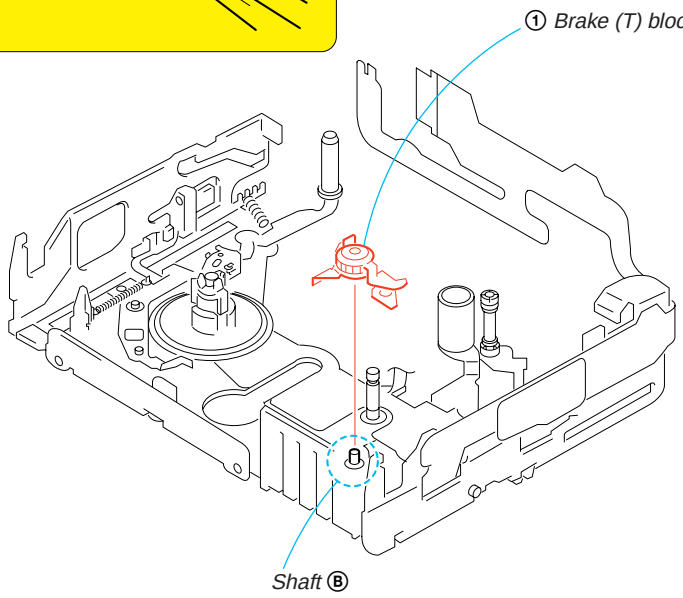
1) Hold the Ⓐ portion of the brake (T) block assy ①. While inserting the slot portion into the notch of the LS chassis block assy, install it into the shaft Ⓑ.
2) After completing installation of T reel table assy (Refer to 3-9.), rotate the brake (T) block assy ① in the clockwise direction by rotating T reel talbe assy in the counter-clockwise direction. (Fig. 1)

BRAKE (T) BLOCK ASSY

Points to be noted

Hold the Ⓐ portion

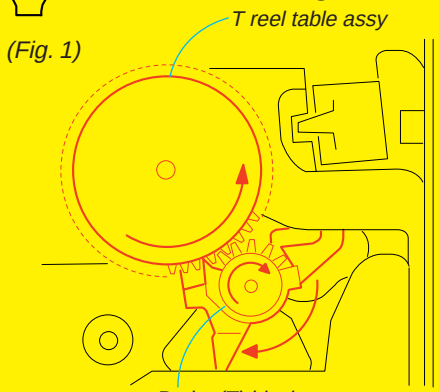




BRAKE (T) BLOCK ASSY

Key Points in Re-assembling

(Fig. 1)



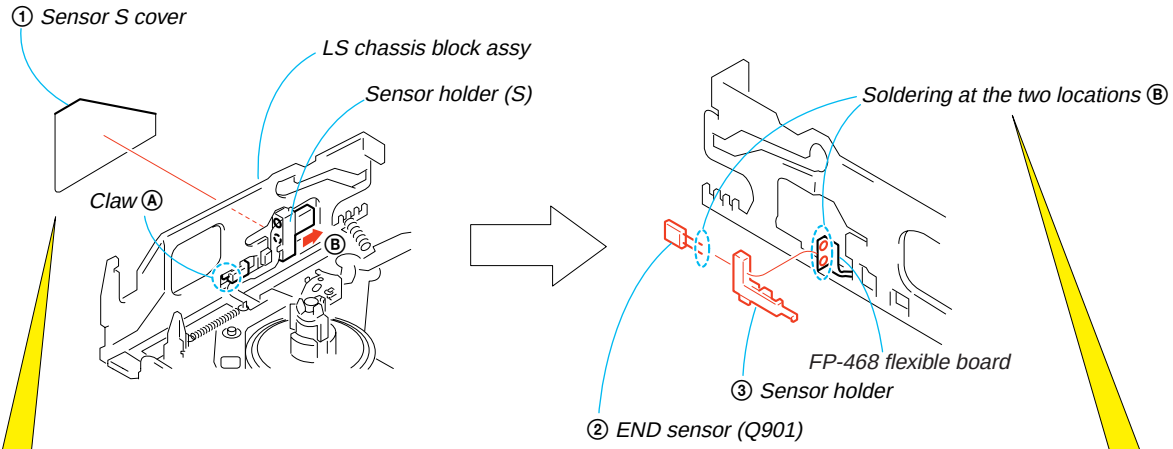
3-20. END Sensor (Q901)

1. Removal procedure

1) Peel off the sensor S cover ①.
2) Release the claw Ⓐ of the sensor holder (S) ③. Remove it from the LS chassis block assy by sliding it in the direction of the arrow Ⓑ.
3) Remove soldering at the two locations and remove the END sensor (Q901) ② and the sensor holder (S) ①.

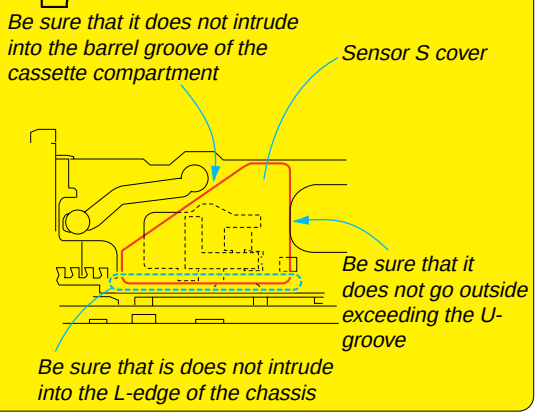
2. Attachment procedure

1) Connect the END sensor (Q901) ② and the sensor holder (S) ③ to the FP-468 flexible board by soldering them at the two locations Ⓑ.
2) Slide the END sensor (Q901) ② and the sensor holder (S) ③ in the direction of the arrow Ⓒ to install them in the LS chassis block assy.
3) Hook the flexible board on the end of the Ⓓ portion.
4) Attach the sensor S cover ①.



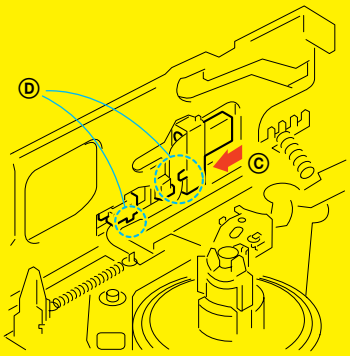
SENSOR S COVER

Key Points in Re-assembling


Be sure that it does not intrude into the barrel groove of the cassette compartment
Sensor S cover
Be sure that it does not go outside exceeding the U-groove
Be sure that is does not intrude into the L-edge of the chassis

END SENSOR (Q901), SENSOR HOLDER (S)

Key Points in Re-assembling



Soldering

Points to be noted

Use the rubber finger tip
cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec

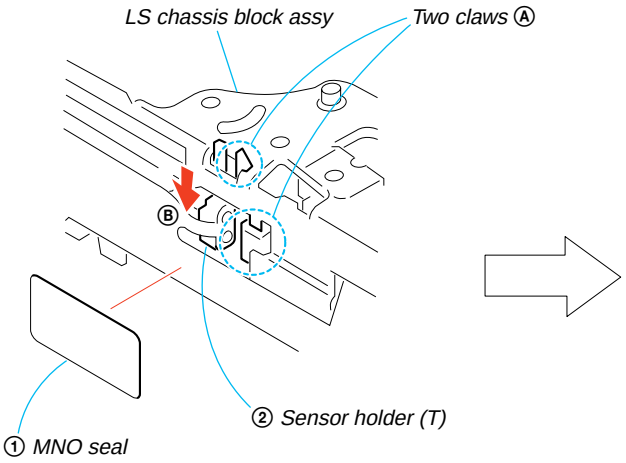
3-21. TOP Sensor (Q902)

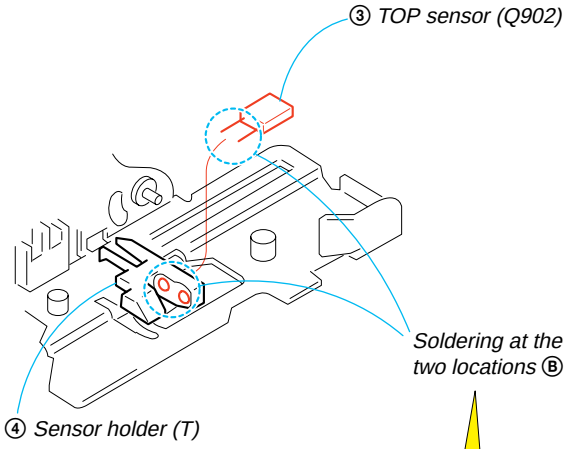
1. Removal procedure

1) Peel off the MNO seal ①.
2) Release the two claws of the sensor holder (T) ② at the two locations Ⓐ. Remove it from the LS chassis block assy by sliding it in the direction of the arrow Ⓑ.
3) Remove the soldering at the two locations Ⓑ and remove the TOP sensor (Q902) ③ and the sensor holder (T) ④.

2. Attachment procedure

1) Connect the TOP sensor (Q902) ③ and the sensor holder (T) ④ to the FP-468 flexible board by soldering them at the two locations Ⓑ.
2) Engage the two claws Ⓐ to install the TOP sensor (Q902) ③ and the sensor holder (T) ④ in the LS chassis block assy.
3) Attach the MNO seal ①.





Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec

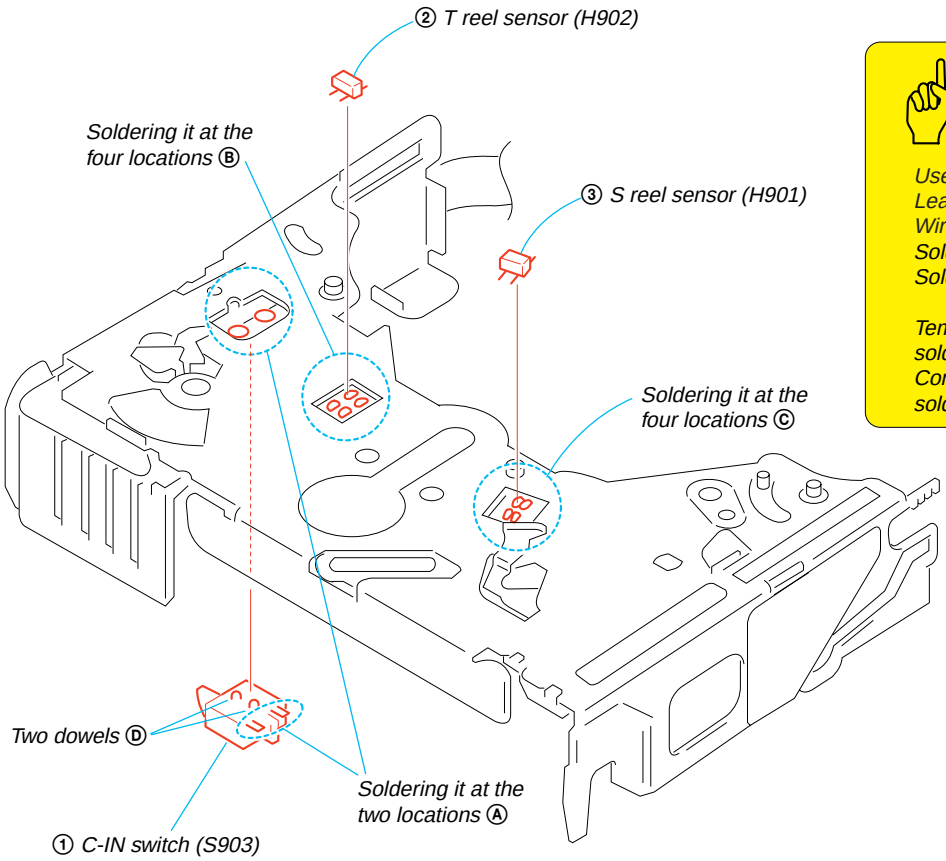
3-22. C-IN Switch (S903), S Reel Sensor (H901) and T Reel Sensor (H902)

1. Removal procedure

1) Remove soldering at the two locations Ⓐ and remove the C-IN switch (S903) ①.
2) Remove soldering at the four locations Ⓑ and remove the T reel sensor (H902) ②.
3) Remove soldering at the four locations Ⓑ and remove the S reel sensor (H901) ③.

2. Attachment procedure

1) Connect the S reel sensor (H901) ③ to the FP-468 flexible board by soldering it at the four locations Ⓒ.
2) Connect the T reel sensor (H902) ② to the FP-468 flexible board by soldering it at the four locations Ⓑ.
3) Align the two dowels Ⓓ and connect the C-IN switch (S903) ① to the FP-468 flexible board by soldering it at the two locations Ⓐ.


② T reel sensor (H902)
Soldering it at the four locations Ⓑ
③ S reel sensor (H901)
Soldering it at the four locations Ⓒ
Two dowels Ⓓ
Soldering it at the two locations Ⓐ
① C-IN switch (S903)

Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ± 10 °C
Contacting time of soldering iron tip : within 2 sec

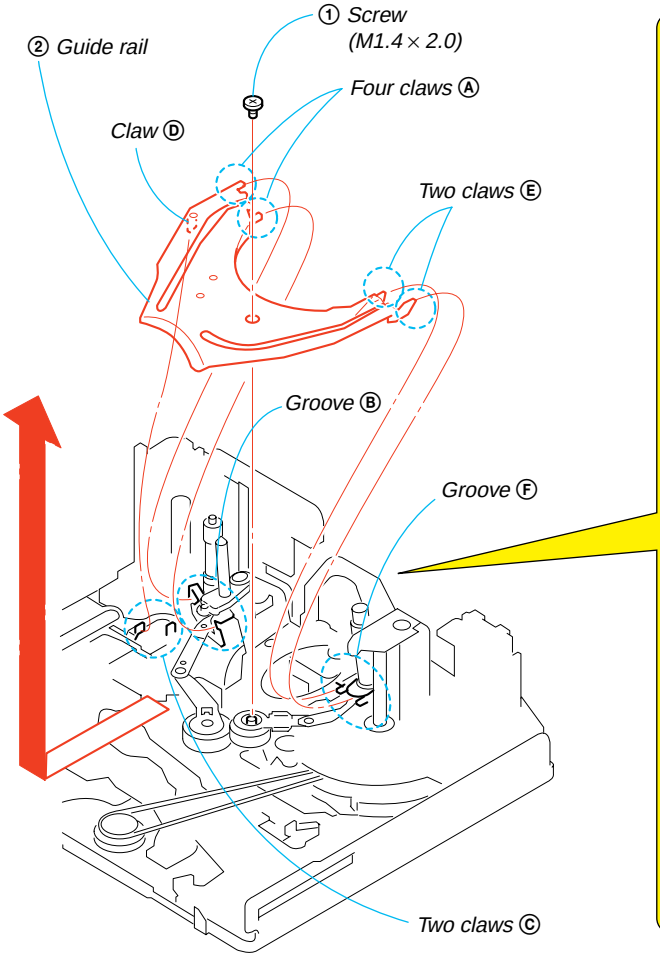
3-23. Guide Rail

1. Removal procedure

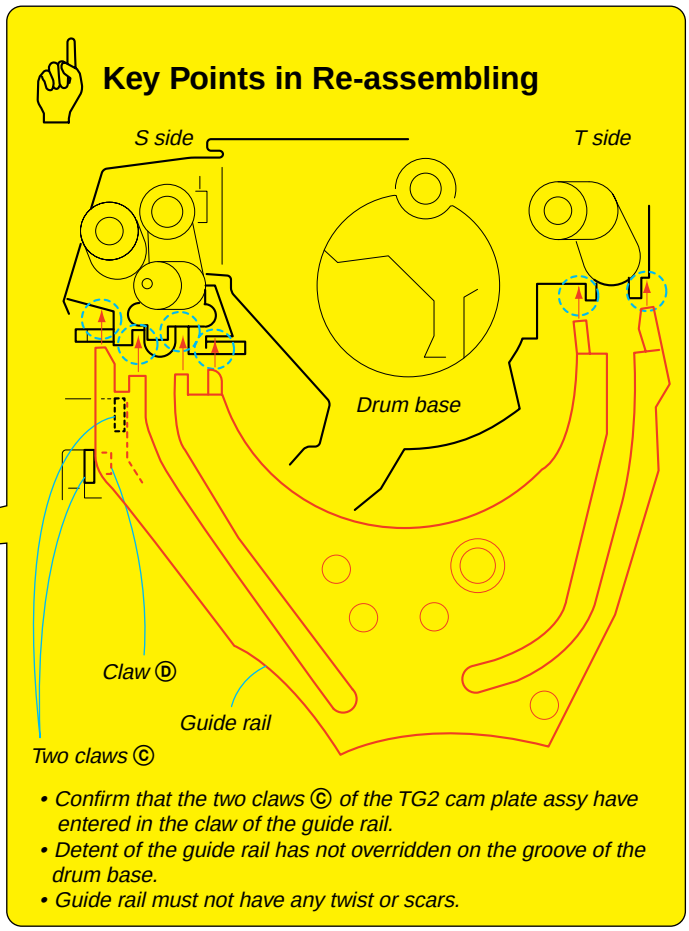
1) Remove the screw (special head screw M1.4 × 2.0) ①.
2) Remove the guide rail ② in the direction of the arrow.

2. Attachment procedure

1) Hold the center of the guide rail ②. While pressing the TG2 cam plate assy, insert the four claws Ⓐ of the guide rail in a slant angle from the top into the drum base's groove Ⓑ. (Insert the top tip of the rail at the same time.) Confirm at this time that the two claws of the TG cam plate assy have entered in the claw Ⓓ of the guide rail.
2) Insert the two claws Ⓔ of the T side guide rail into the groove Ⓕ of the drum base.
3) Tighten the screw (special head screw M1.4 × 2.0) ①.
Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



GUIDE RAIL


Key Points in Re-assembling
S side
T side
Drum base
Claw Ⓓ
Guide rail
Two claws Ⓒ
• Confirm that the two claws Ⓒ of the TG2 cam plate assy have entered in the claw of the guide rail.
• Detent of the guide rail has not overridden on the groove of the drum base.
• Guide rail must not have any twist or scars.

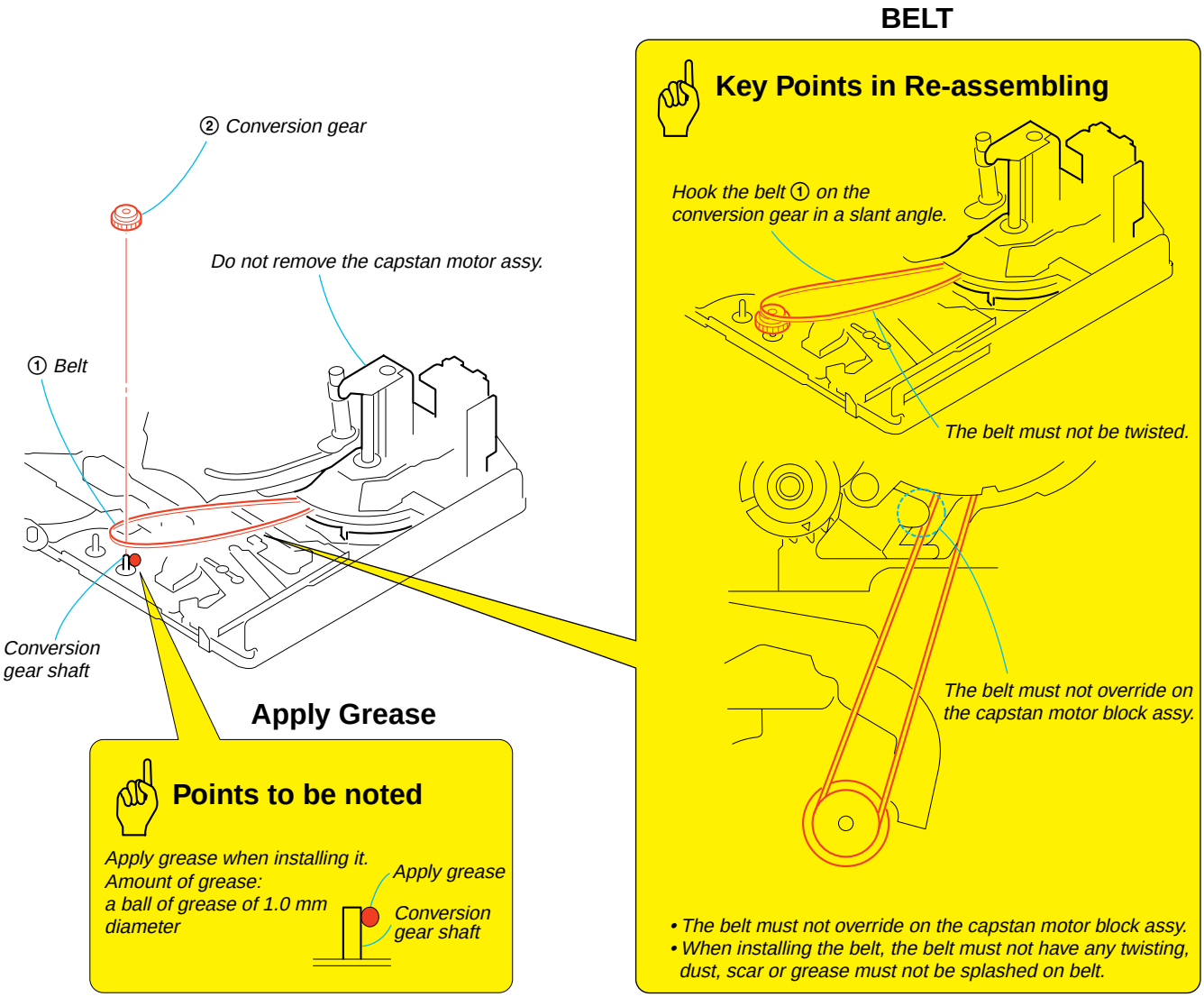
3-24. Conversion Gear

1. Removal procedure

1) Remove the belt ① from the conversion gear.
2) Remove the conversion gear ② from the conversion gear shaft.

2. Attachment procedure

1) Apply grease to the conversion gear shaft.
   Amount of grease: a ball of grease of 1.0 mm diameter
2) Install the conversion gear ② in the conversion gear shaft.
3) Hook the belt ① on the conversion gear in a slant angle and install it by rotating the conversion gear with fingertip.


② Conversion gear
Do not remove the capstan motor assy.
① Belt
Conversion gear shaft
Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
Apply grease
Conversion gear shaft
BELT
Key Points in Re-assembling
Hook the belt ① on the conversion gear in a slant angle.
The belt must not be twisted.
The belt must not override on the capstan motor block assy.
• The belt must not override on the capstan motor block assy.
• When installing the belt, the belt must not have any twisting, dust, scar or grease must not be splashed on belt.

3-25. Coaster (S) Block Assy and Coaster (T) Block Assy

1. Removal procedure

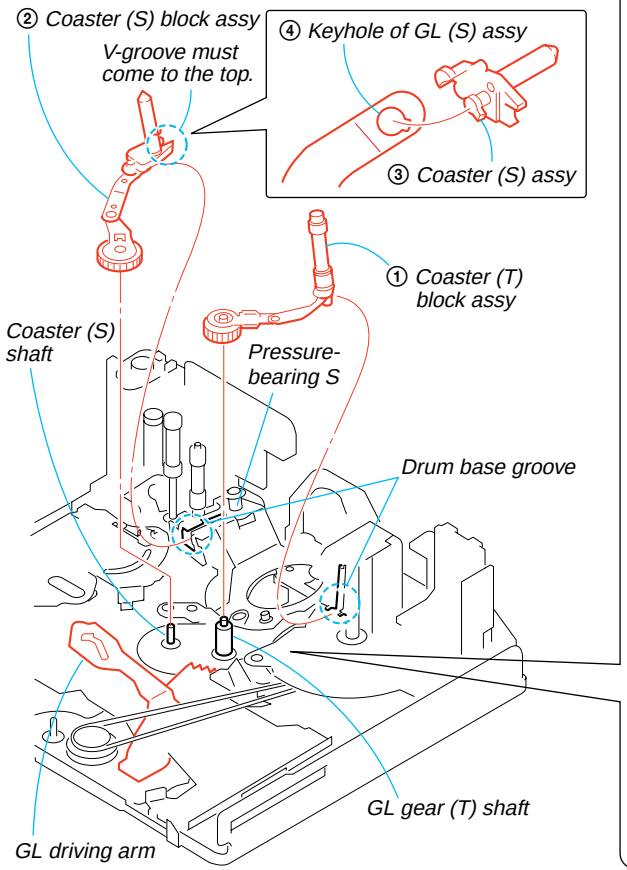
1) Remove the coaster (T) block assy ① from the coaster (T) block shaft. Remove the coaster (T) block assy from the right groove of the drum base.
2) Remove the coaster (S) block assy ② from the coaster (S) block shaft. Remove the coaster (S) block assy from the left groove of the drum base.
3) Remove coaster (S) assy ③ by rotating it through the key hole of GL (S) assy ④.

2. Attachment procedure

1) Install the coaster (S) assy ③ into the key hole of the GL (S) assy ④ by rotating it.
2) Insert the coaster (S) block assy ② into the coaster (S) block shaft. While aligning it with the left groove of the drum base, push it in the way that the V-groove comes to the top until it reaches the pressure-bearing S.
3) Push in the coaster (T) block assy ① along with the right groove of the drum base. Align the phase of the GL gear S, GL gear T and the GL drive arm at the three phasing locations. Then install the coaster (T) block assy ① in the coaster (T) block assy shaft.

Key Points in Re-assembling

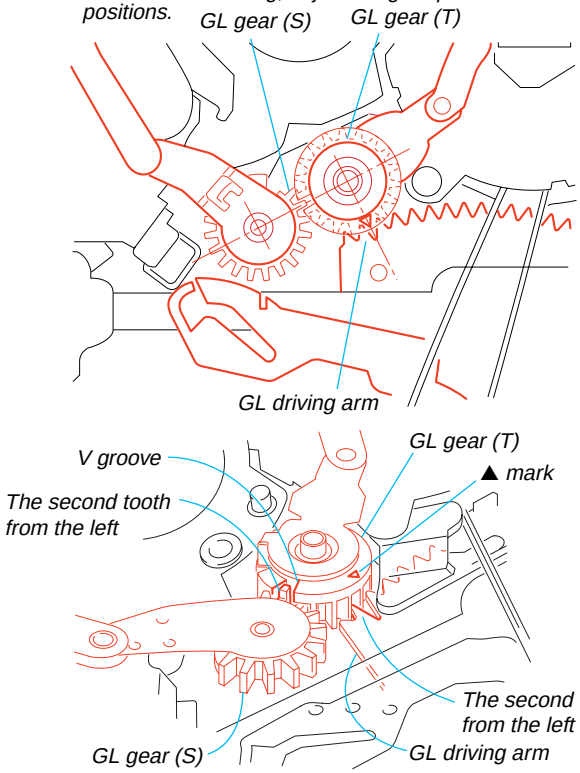
- *When aligning the coaster (S) assy with the left groove of the drum base, the V-groove must come to the top.*
- *TG4 and TG5 must not have any stain and their arms must not be deformed.*


② Coaster (S) block assy
V-groove must come to the top.
④ Keyhole of GL (S) assy
③ Coaster (S) assy
① Coaster (T) block assy
Coaster (S) shaft
Pressure-bearing S
Drum base groove
GL gear (T) shaft
GL driving arm

Phase Adjustment

Key Points in Re-assembling

When re-assembling, adjust the gear phase at the three positions.



- *The second tooth from the left of the GL gear (S) and the V-groove of the GL gear (T) must be in phase.*
- *The second tooth from the left of the GL drive arm and the ▲ mark must be in phase.*

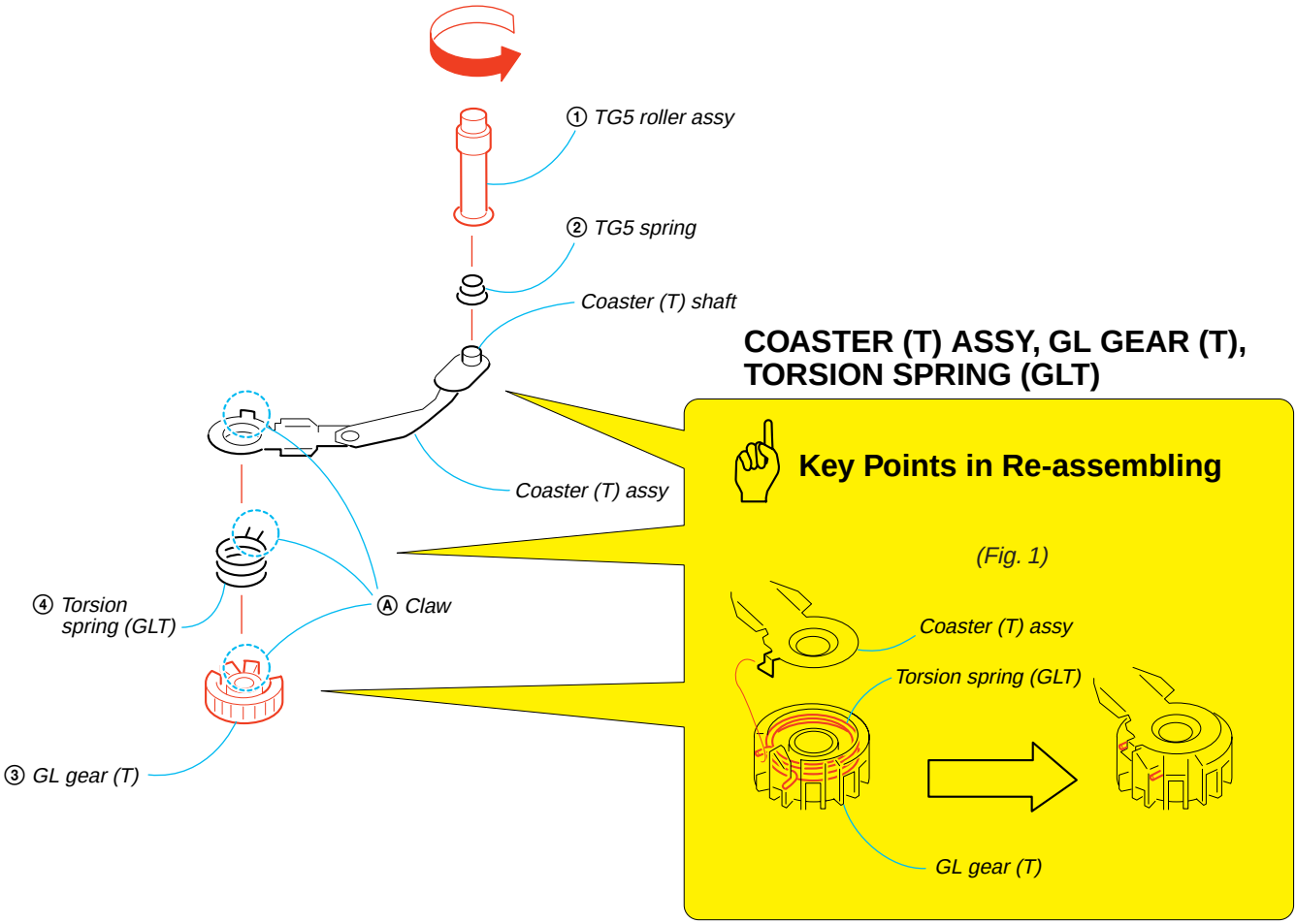
3-26. TG5 Roller Assy and GL Gear (T)

1. Removal procedure

1) Rotate the TG5 roller assy ① in the direction of the arrow and remove the TG5 roller assy ① and the TG5 spring ② from the coaster (T) assy.
2) Release the claw (A) and remove the GL gear (T) ③ and the torsion coil spring (GLT) ④ from the coaster (T) assy.

2. Attachment procedure

1) Install the GL gear (T) ③ and the torsion coil spring (GLT) ④ into the coaster (T) assy.
2) Install the TG5 spring ② into the coaster (T) assy.
3) Install the TG5 roller assy ① into the coaster (T) assy by rotating it in the direction opposite to the arrow.



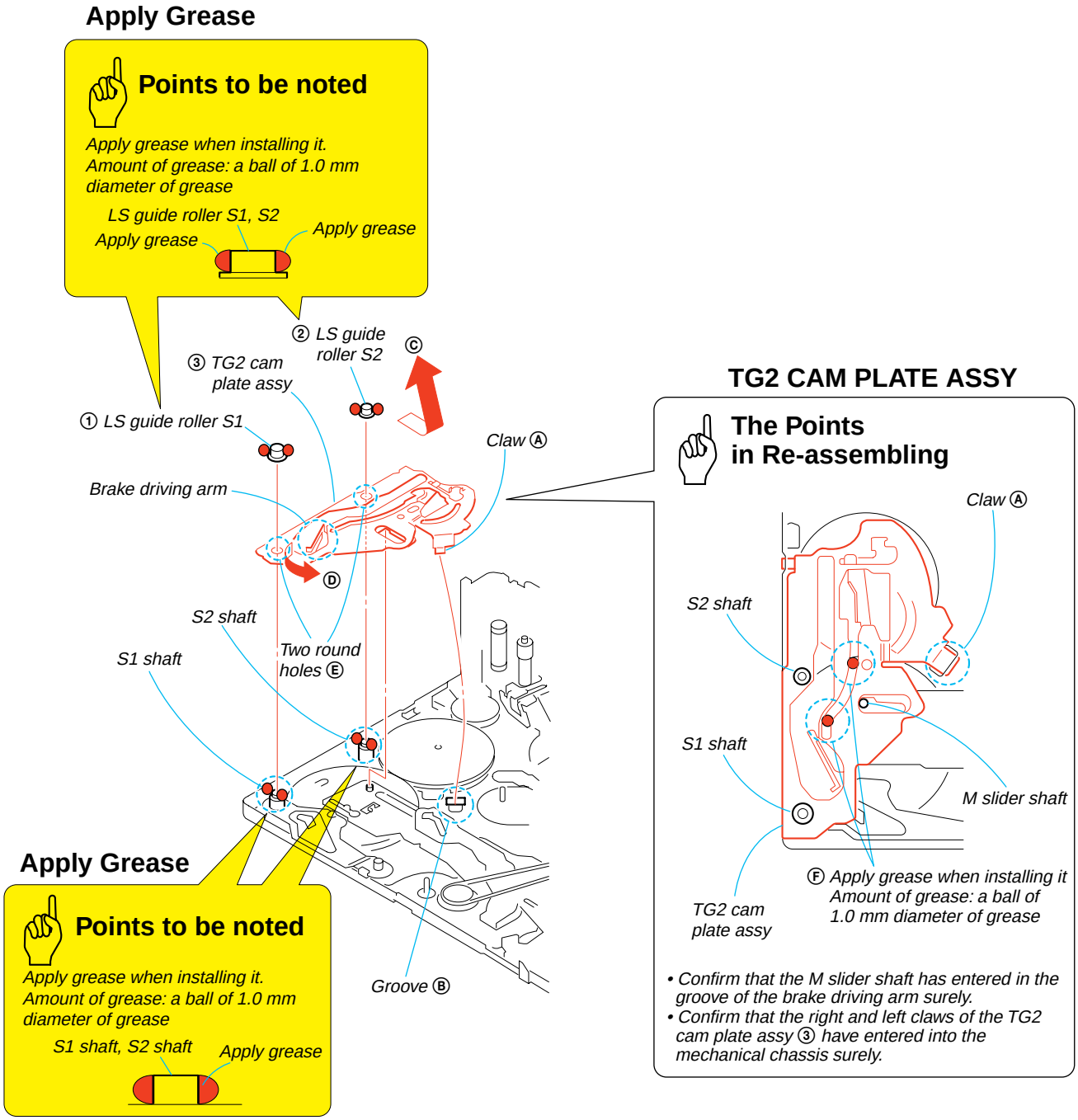
3-27. TG2 Cam Plate Assy

1. Removal procedure

1) Remove the LS guide roller (S1) ① from the S1 shaft.
2) Remove the LS guide roller (S2) ② from the S2 shaft.
3) Release the claw Ⓐ of the TG2 cam plate assy ③ from the right groove Ⓑ of the mechanical chassis.
4) Remove the TG2 cam plate assy ③ in the direction of the arrow Ⓒ.

2. Attachment procedure

1) Move the brake driving arm of the TG2 cam plate assy ③ in the direction of the arrow Ⓓ.
2) Insert the right claw Ⓐ of the TG2 cam plate assy ③ into the right groove Ⓑ of the mechanical chassis first.
3) Install the two round holes Ⓔ of the TG2 cam plate assy ③ into the S1 shaft and the S2 shaft.
4) Apply grease in the Ⓕ portion of the TG2 cam plate assy.
   Amount of grease: a ball of 1.0 mm diameter of grease
5) Apply grease to both sides of the S1 shaft and the S2 shaft.
   Amount of grease: a ball of 1.0 mm diameter of grease
6) Apply grease to both sides of the LS guide roller S1, S2.
7) Install the LS guide roller S1 ① in the S1 shaft.
8) Install the LS guide roller S2 ② in the S2 shaft.


Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
LS guide roller S1, S2
Apply grease
Apply grease
② LS guide roller S2
Ⓒ
③ TG2 cam plate assy
① LS guide roller S1
Claw Ⓐ
Brake driving arm
Ⓓ
S2 shaft
S1 shaft
Two round holes Ⓔ
Groove Ⓑ
Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
S1 shaft, S2 shaft
Apply grease
TG2 CAM PLATE ASSY
The Points in Re-assembling
Claw Ⓐ
S2 shaft
S1 shaft
M slider shaft
Ⓕ Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
TG2 cam plate assy
• Confirm that the M slider shaft has entered in the groove of the brake driving arm surely.
• Confirm that the right and left claws of the TG2 cam plate assy ③ have entered into the mechanical chassis surely.

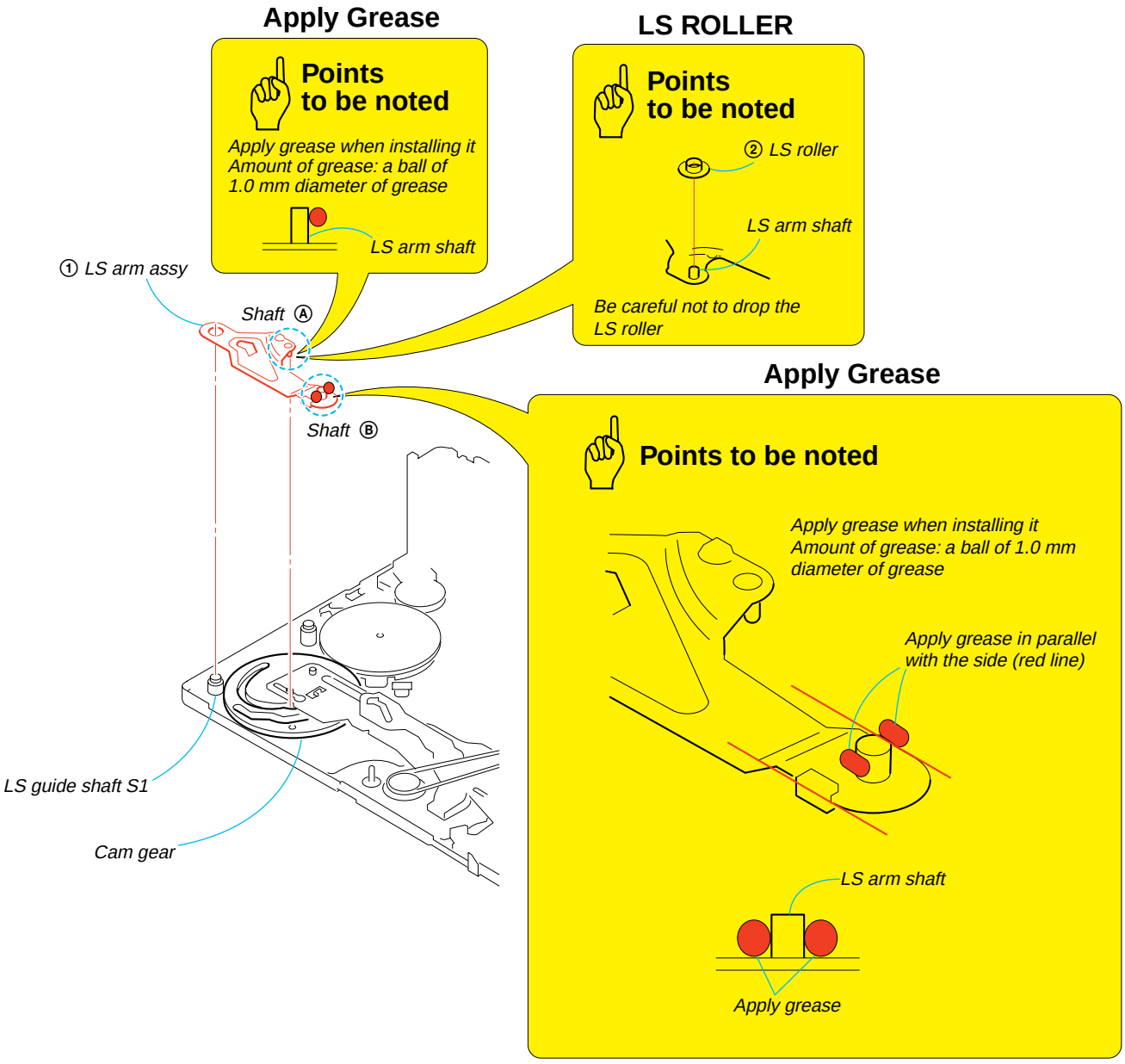
3-28. LS Arm Assy

1. Removal procedure

1) Remove the LS arm assy ① from the LS guide S1 shaft.
2) Turn over the LS arm assy and remove the LS roller ②.

2. Attachment procedure

1) Apply grease to the LS arm shaft Ⓐ (on the side).
2) Install the LS roller ② into the LS arm shaft.
3) Turn over the LS arm assy ① and install it while matching the phase of the LS guide shaft S1 and the cam gear groove.
4) Apply grease to the LS arm shaft Ⓑ (on its side).


Apply Grease
Points to be noted
Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
LS arm shaft
LS ROLLER
Points to be noted
② LS roller
LS arm shaft
Be careful not to drop the LS roller
① LS arm assy
Shaft Ⓐ
Shaft Ⓑ
Apply Grease
Points to be noted
Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
Apply grease in parallel with the side (red line)
LS arm shaft
Apply grease
LS guide shaft S1
Cam gear

3-29. M Slider Assy (1)

1. Removal procedure

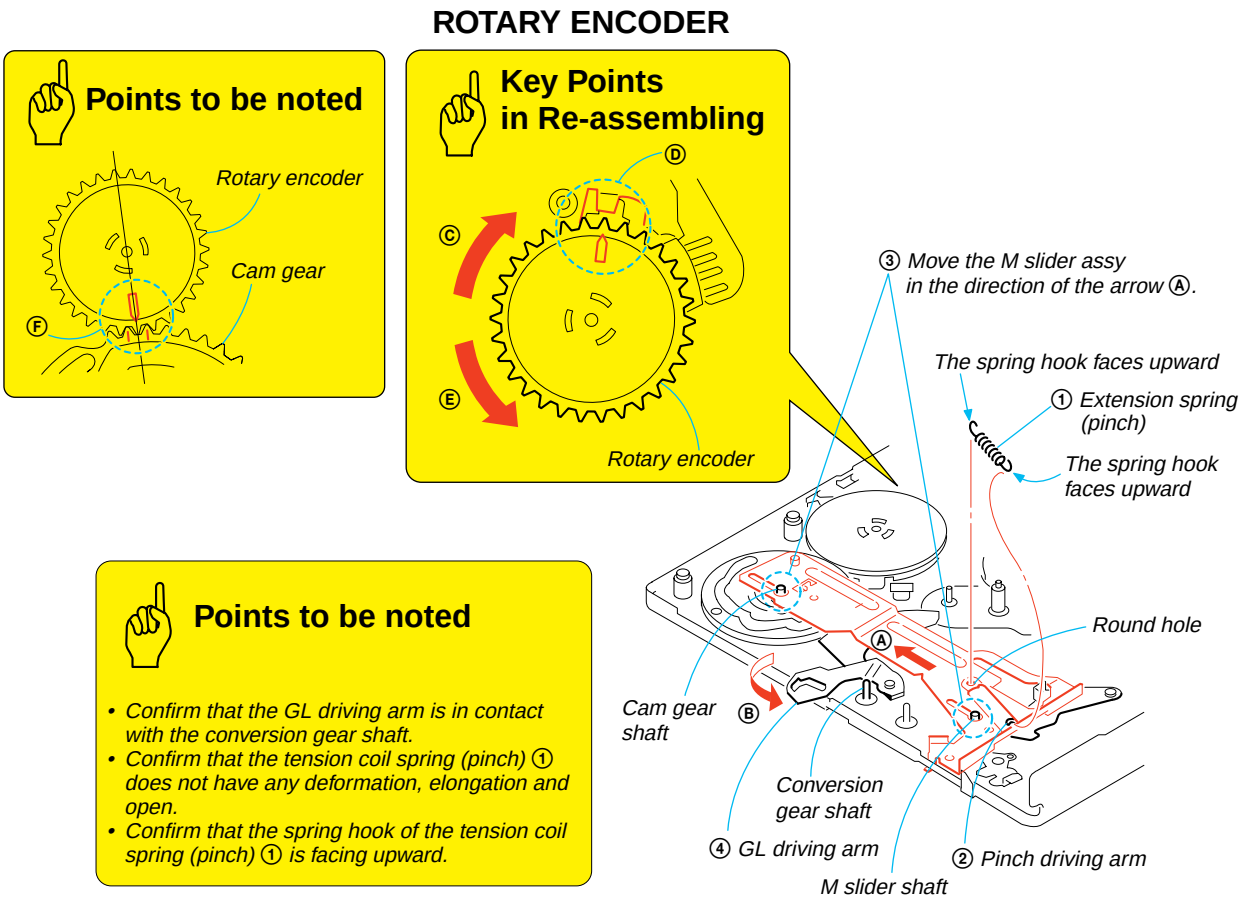
1) Remove an end of the tension spring (pinch) ① from the round hole of the M slider.
2) Remove another end of the tension spring (pinch) ① from the pinch driving arm ②.
3) Rotate the rotary encoder in the direction of the arrow Ⓔ, and align the ▲ mark of ratary encoder with the tooth bottom between second and third teeth Ⓕ. Move by hand in the direction of the arrow Ⓐ until the cam gear shaft and M slider shaft match with the shaft hole of the M slider assy ③.
4) Push in the direction of the arrow Ⓑ until the GL driving arm ④ gets in contact with the conversion gear shaft.

(to be continued to next items 5) through 7) on next page)

2. Attachment procedure

(continued from the previous items 1) through 5) on next page)

6) Move the conversion gear shaft in the direction opposite tot he arrow mark Ⓑ as far as it can go.
7) Rotate the rotary encoder in the direction of the arrow Ⓒ until the ▲ mark arrives at the position Ⓓ.
8) Install an end of the tension coil spring (pinch) ① on the pinch driving arm ② (in the way that spring hook faces upward).
9) Install another end of the tension coil spring (pinch) ① on the round hole of the M slider (in the way that spring hook faces upward).


ROTARY ENCODER
Points to be noted
Rotary encoder
Cam gear
Ⓕ
Key Points in Re-assembling
Ⓓ
Ⓒ
Ⓔ
Rotary encoder
③ Move the M slider assy in the direction of the arrow Ⓐ.
The spring hook faces upward
① Extension spring (pinch)
The spring hook faces upward
Round hole
Cam gear shaft
Ⓑ
Conversion gear shaft
④ GL driving arm
② Pinch driving arm
M slider shaft
Points to be noted
• Confirm that the GL driving arm is in contact with the conversion gear shaft.
• Confirm that the tension coil spring (pinch) ① does not have any deformation, elongation and open.
• Confirm that the spring hook of the tension coil spring (pinch) ① is facing upward.

3-30. M Slider Assy (2)

1. Removal procedure

(continued from the previous items 1) through 5) on previous page)

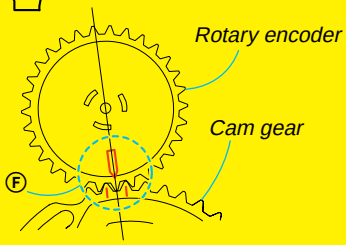
5) Remove the cam gear shaft and the M slider shaft from the two shaft holes Ⓐ of the M slider assy ①.
6) Remove the top tip Ⓑ of the M slider assy ① from the notch of the mechanical chassis in the direction of the arrow.
7) Remove the M slider assy ①.

2. Attachment procedure

1) Apply grease to the cam gear shaft and the M slider shaft (neck groove of the shaft where the M slider slides).
   Amount of grease: a ball of 1.0 mm diameter of grease
2) Align the hole of the pinch driving arm and the hole of the mechanical chassis.
3) Insert the top tip Ⓑ of the M slider assy ① into the notch of the mechanism chassis, and at the same time install the M slider assy ① into the GL driving arm.
4) Align the ▲ mark of rotary encoder with the tooth bottom between second and third teeth Ⓕ.
5) Install the cam gear shaft and the M slider shaft into the tow shaft holes Ⓐ of the M slider assy.

(to be continued to next items 6) through 9) on previous page)

Points to be noted



M SLIDER ASSY

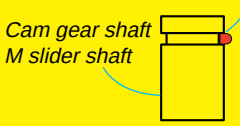
Key Points in Re-assembling

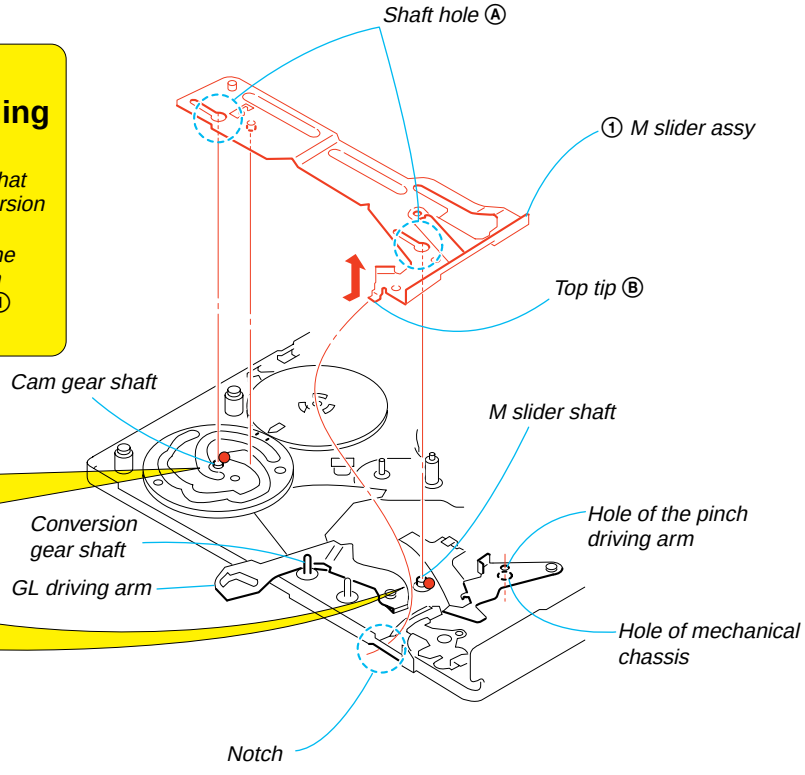
- *When installing the M slider assy ①, confirm that the GL driving arm is in contact with the conversion gear shaft.*
- *Confirm that you have not forgotten to insert the top tip Ⓑ of the M slider assy ① into the notch of the mechanical chassis. The M slider assy ① should not have any deformation.*

Apply Grease

Points to be noted

Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
Neck groove of the shaft where the M slider slides





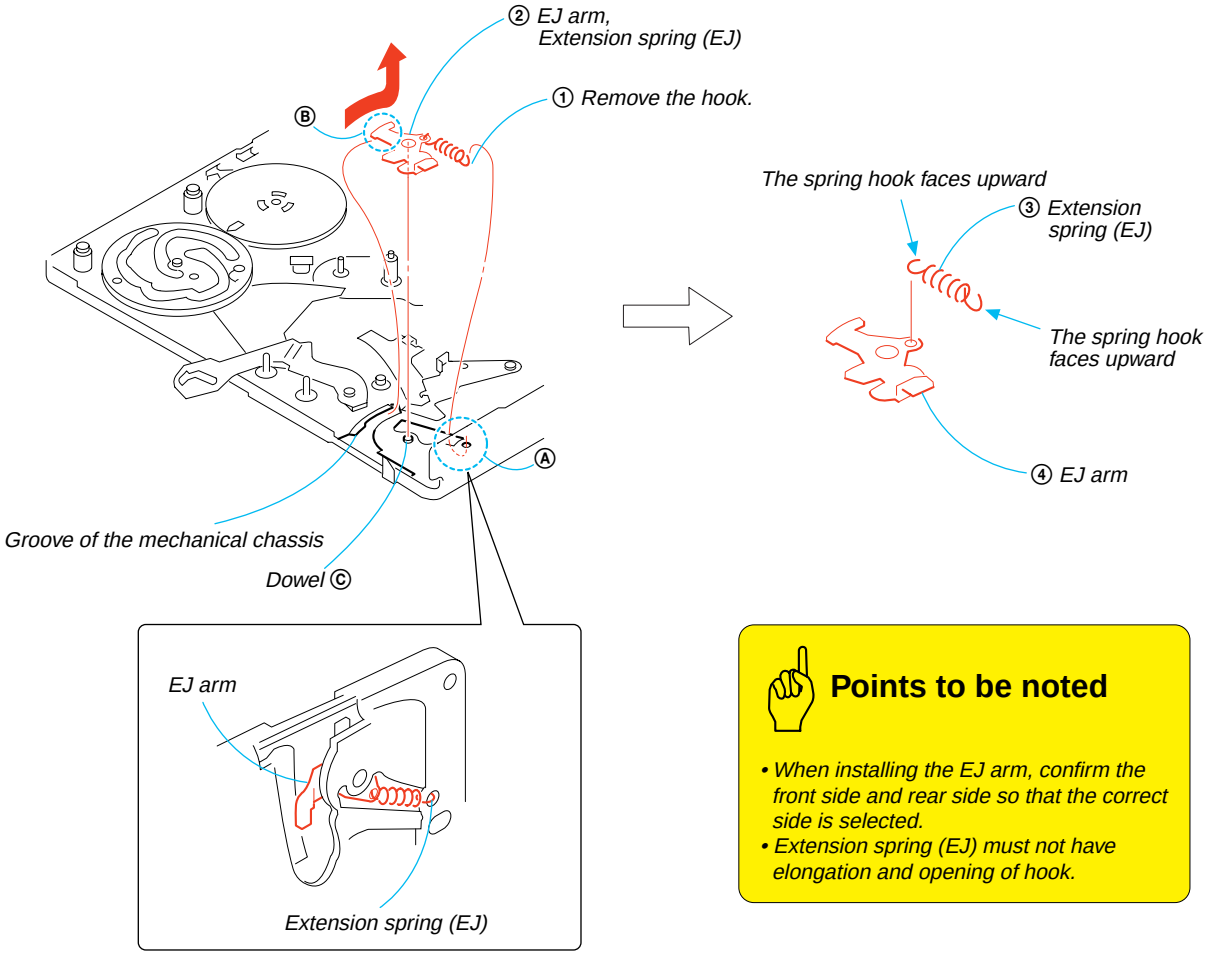
3-31. EJ Arm

1. Removal procedure

1) Remove the hook ① of the tension coil spring (EJ arm) ③ that is hooked on the round hole Ⓐ.
2) Remove the EJ arm and the tension coil spring (EJ arm) ② all together in the direction of the arrow.
3) Remove the tension coil spring (EJ arm) ③ from the EJ arm ④.

2. Attachment procedure

1) Install the tension coil spring (EJ arm) ③ into the round hole of the EJ arm ④ with the hook facing upward.
2) Insert the top tip (bent) portion Ⓑ of the EJ arm ④ into the groove of the mechanical chassis. Insert the dowel Ⓒ into the round hole of the EJ arm.
3) Insert he tension coil spring ① into the round hole Ⓐ of the mechanical chassis with the hook facing upward.



Points to be noted

- *When installing the EJ arm, confirm the front side and rear side so that the correct side is selected.*
- *Extension spring (EJ) must not have elongation and opening of hook.*

3-32. Cam Gear and GL Driving

1. Removal procedure

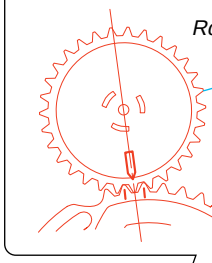
1) Rotate the GL driving arm Ⓗ block assy in the direction of the arrow Ⓘ until it contacts with the conversion gear shaft.
2) Remove the cam gear ②.
3) Remove the GL driving arm ③.

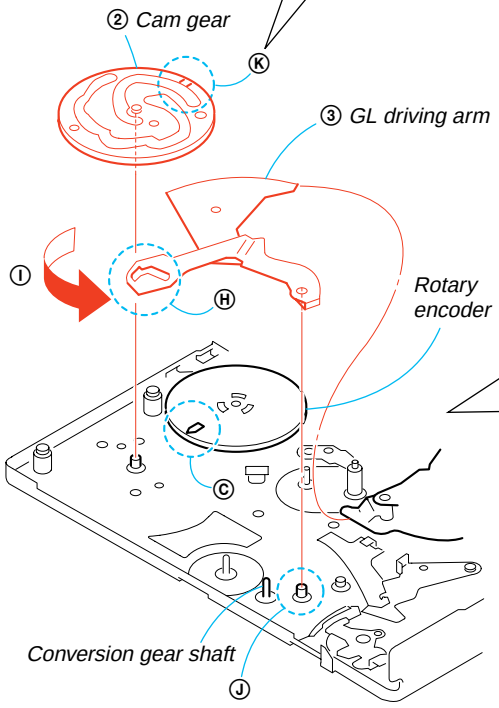
2. Attachment procedure

1) Insert the GL driving arm ③ into the shaft Ⓙ of the mechanical chassis and rotate the GL driving arm Ⓗ block assy in the direction of the arrow Ⓘ until it contacts with the conversion gear shaft.
2) Confirm the front side and rear side of the cam gear ② so that the correct side is selected. Install the cam gear ② while matching phase of the ▲ mark Ⓒ with the second tooth valley Ⓚ and the third tooth valley Ⓚ of the cam gear.
3) Apply grease to the specified locations Ⓐ to Ⓖ of the cam gear.

Matching Phase

Key Points in Re-assembling



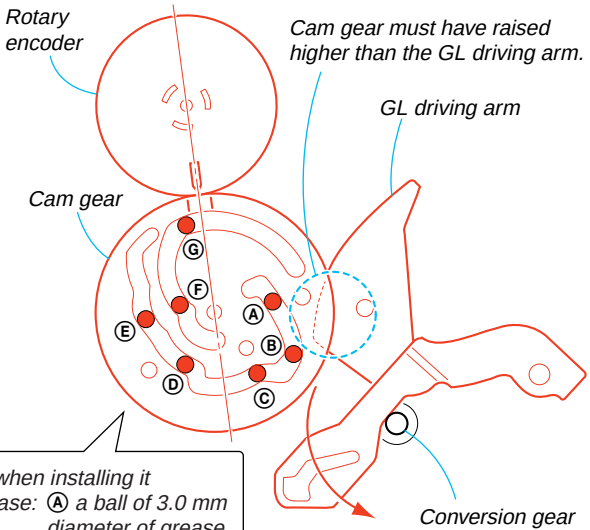


Points to be noted

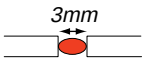
- *Confirm that the phase of the cam gear and that of the rotary encoder are matched and in phase.*
- *Confirm that the cam gear overrides on the GL driving arm.*
- *Confirm that the GL driving arm is contact with the conversion shaft.*
- *Do not apply grease to any locations other than the specified location. Apply grease of the specified amount.*

Notes When Applying Grease and During Installation

Key Points in Re-assembling



Apply grease when installing it
Amount of grease: Ⓐ a ball of 3.0 mm diameter of grease Ⓑ to Ⓖ a ball of 2.0 mm diameter of grease



Sides of the both grooves

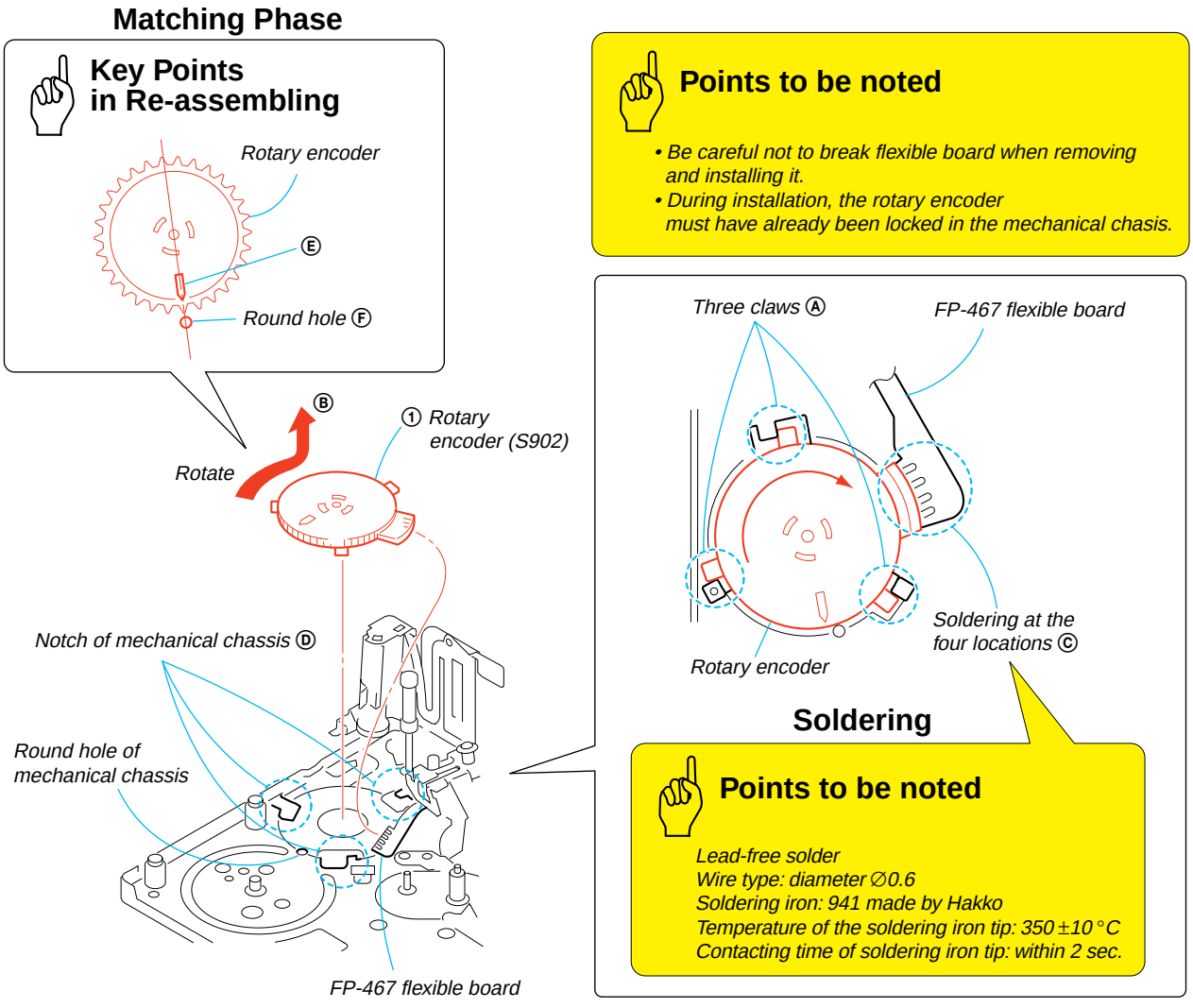
3-33. Rotary Encoder (S902)

1. Removal procedure

1) Remove the three claws Ⓐ of the rotary encoder (S902) ① from the three notches of the mechanical chassis.
2) Rotate the rotary encoder (S902) ① in the direction of the arrow Ⓑ and remove.
3) Remove soldering (at the four locations) Ⓒ to which the rotary encoder (S902) is attached.

2. Attachment procedure

1) Make soldering (at the four locations) Ⓒ so that the rotary encoder (S902) ① is connected to the FP-467 flexible board.
2) Place the rotary encoder (S902) ① on top of the notch Ⓓ of the mechanical chassis. Lock the three claws Ⓐ of the rotary encoder (S902) ① into the notches Ⓓ of the mechanical chassis.
3) Match the phase of the ▲ mark Ⓔ of the rotary encoder (S902) ① with the phase of the round hole Ⓕ of the mechanical chassis.


Matching Phase
Key Points in Re-assembling
Rotary encoder
Ⓔ
Round hole Ⓕ
Ⓑ
① Rotary encoder (S902)
Rotate
Notch of mechanical chassis Ⓓ
Round hole of mechanical chassis
FP-467 flexible board
Points to be noted
• Be careful not to break flexible board when removing and installing it.
• During installation, the rotary encoder must have already been locked in the mechanical chasis.
Three claws Ⓐ
FP-467 flexible board
Soldering at the four locations Ⓒ
Rotary encoder
Soldering
Points to be noted
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Temperature of the soldering iron tip: 350 ±10 °C
Contacting time of soldering iron tip: within 2 sec.

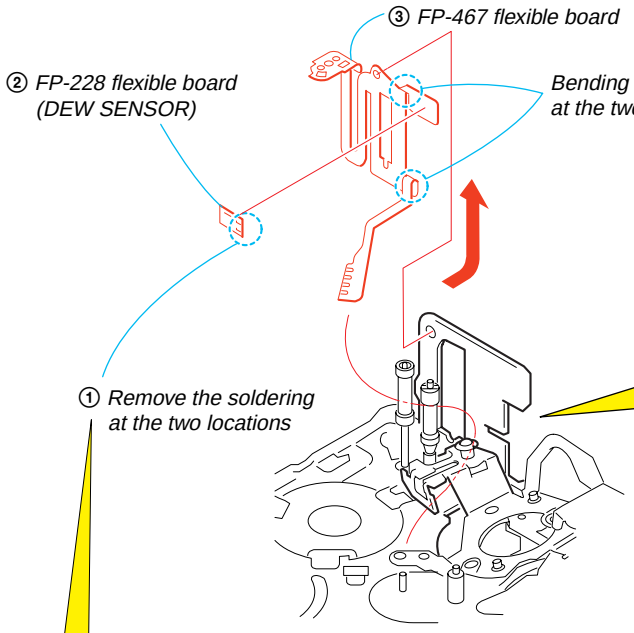
3-34. FP-228 Flexible Board (DEW SENSOR) and FP-467 Flexible Board

1. Removal procedure

1) Remove the soldering at the two locations ① and remove the FP-228 flexible board (DEW SENSOR) ②.
2) Remove the FP-467 flexible board ③ from the mechanical chassis in the direction of the arrow.

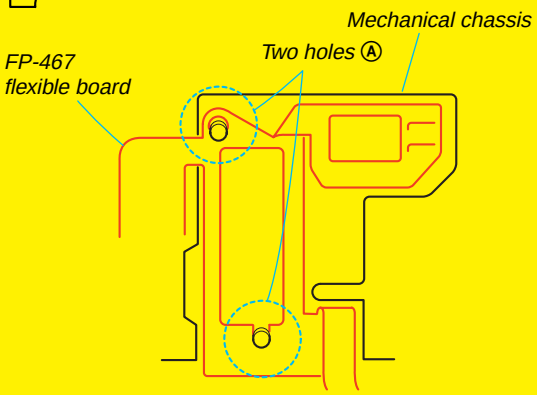
2. Attachment procedure

1) Match the phase of the two holes Ⓐ of the FP-467 flexible board ③ with the holes of the mechanical chassis, and attach them each other.
2) Attach the FP-228 flexible board (DEW SENSOR) ② to the FP-467 flexible board ③.
3) Connect the terminals at the two locations ① by soldering.


③ FP-467 flexible board
② FP-228 flexible board (DEW SENSOR)
Bending the flexible board at the two locations
① Remove the soldering at the two locations

FP-467 FLEXIBLE BOARD

Key Points in Re-assembling



Soldering

Points to be noted

Lead-free solder
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.

- *Be careful not to create the hollow soldering, Br, and there must be no lacking of parts. There must not be solder ball.*
- *Be careful not to contact the soldering iron tip too long time.*

Points to be noted

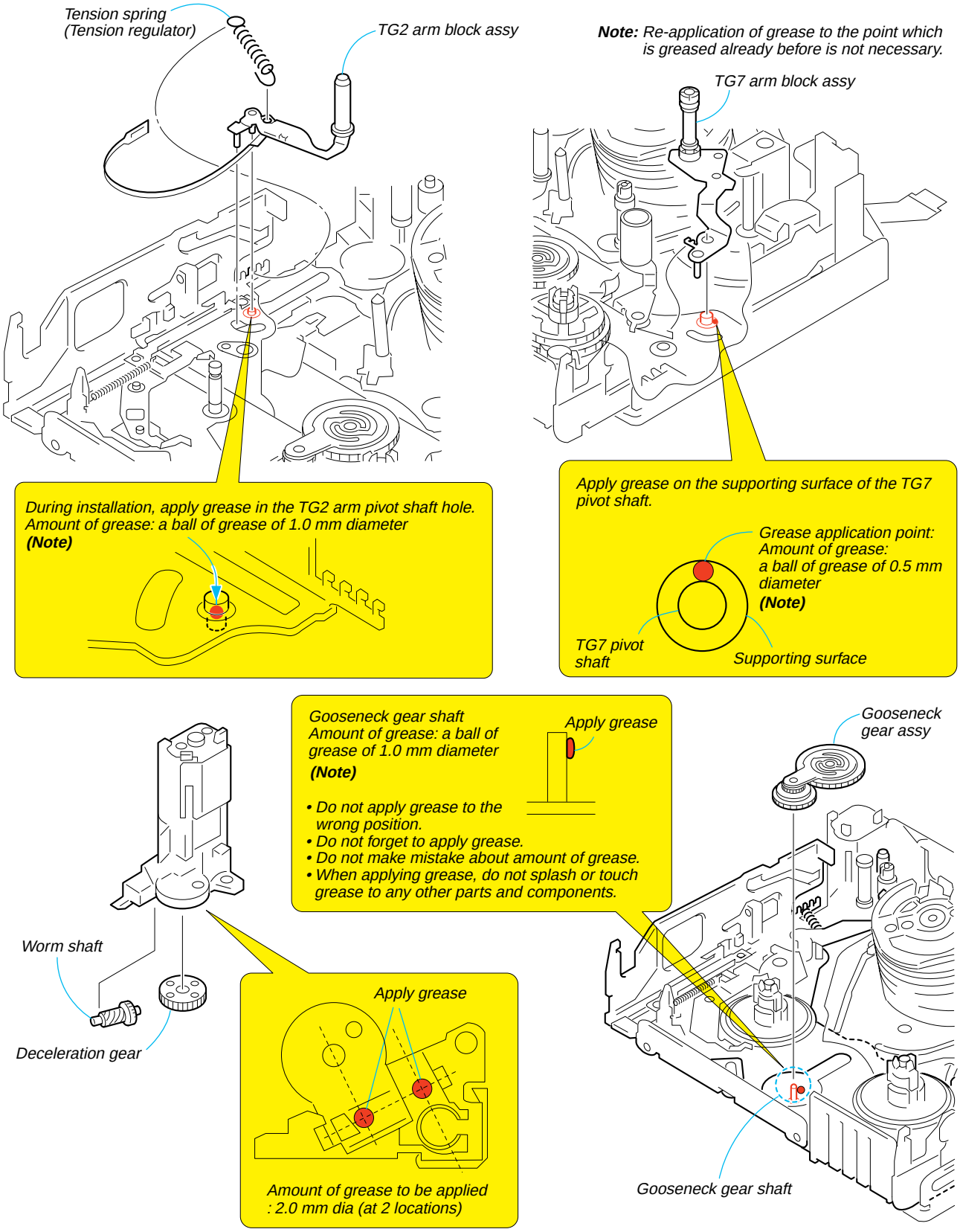
- *Be careful not to break the flexible board to have open circuit when installing and removing it.*
- *Be careful that flexible board must not override on anything.*
- *Be careful that the two bending portions of the FP-467 flexible board must not be bent excessively that results in open circuit and breakdown of flexible board.*
- *Do not rub the DEW sensor with any rubbing bars.*

2003.01.30

HELP

Application of grease, soldering method and precautions, and phase matching adjustment are compiled and below.

Apply grease (1)

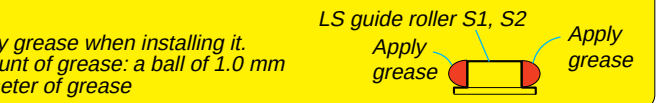

Tension spring
(Tension regulator)
TG2 arm block assy
Note: Re-application of grease to the point which is greased already before is not necessary.
TG7 arm block assy
During installation, apply grease in the TG2 arm pivot shaft hole.
Amount of grease: a ball of grease of 1.0 mm diameter
(Note)
Apply grease on the supporting surface of the TG7 pivot shaft.
Grease application point:
Amount of grease:
a ball of grease of 0.5 mm diameter
(Note)
TG7 pivot shaft
Supporting surface
Gooseneck gear shaft
Amount of grease: a ball of grease of 1.0 mm diameter
(Note)
Apply grease
• Do not apply grease to the wrong position.
• Do not forget to apply grease.
• Do not make mistake about amount of grease.
• When applying grease, do not splash or touch grease to any other parts and components.
Gooseneck gear assy
Worm shaft
Deceleration gear
Apply grease
Amount of grease to be applied
: 2.0 mm dia (at 2 locations)
Gooseneck gear shaft

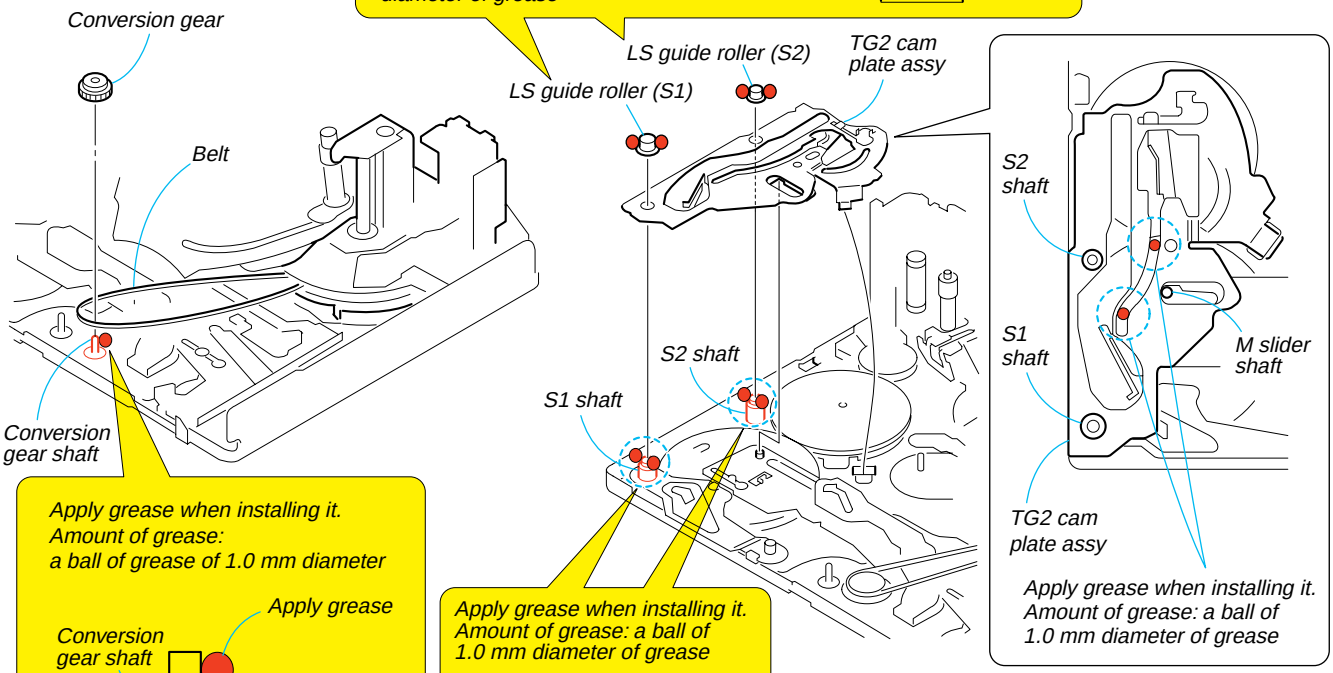
Apply grease (2)

Apply Grease

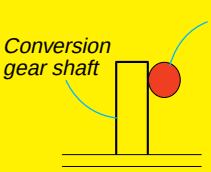
Points to be noted

Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease



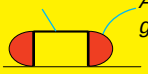


Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter



Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

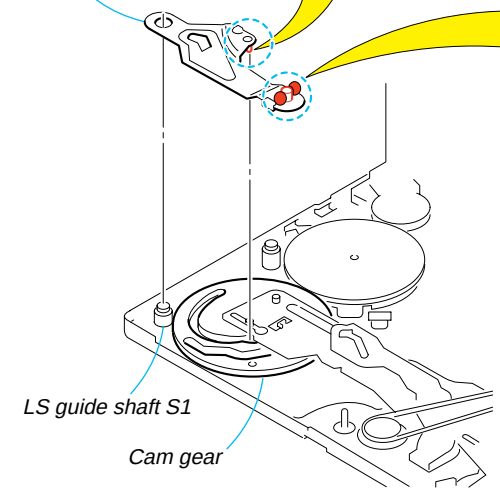
S1 shaft, S2 shaft



Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

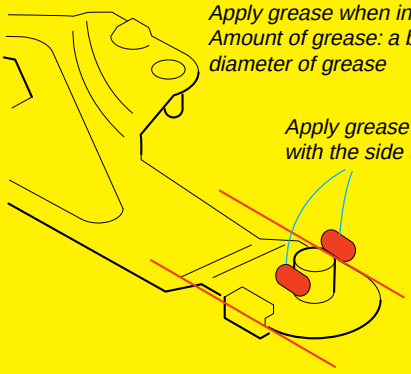
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

LS arm shaft

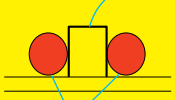


Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

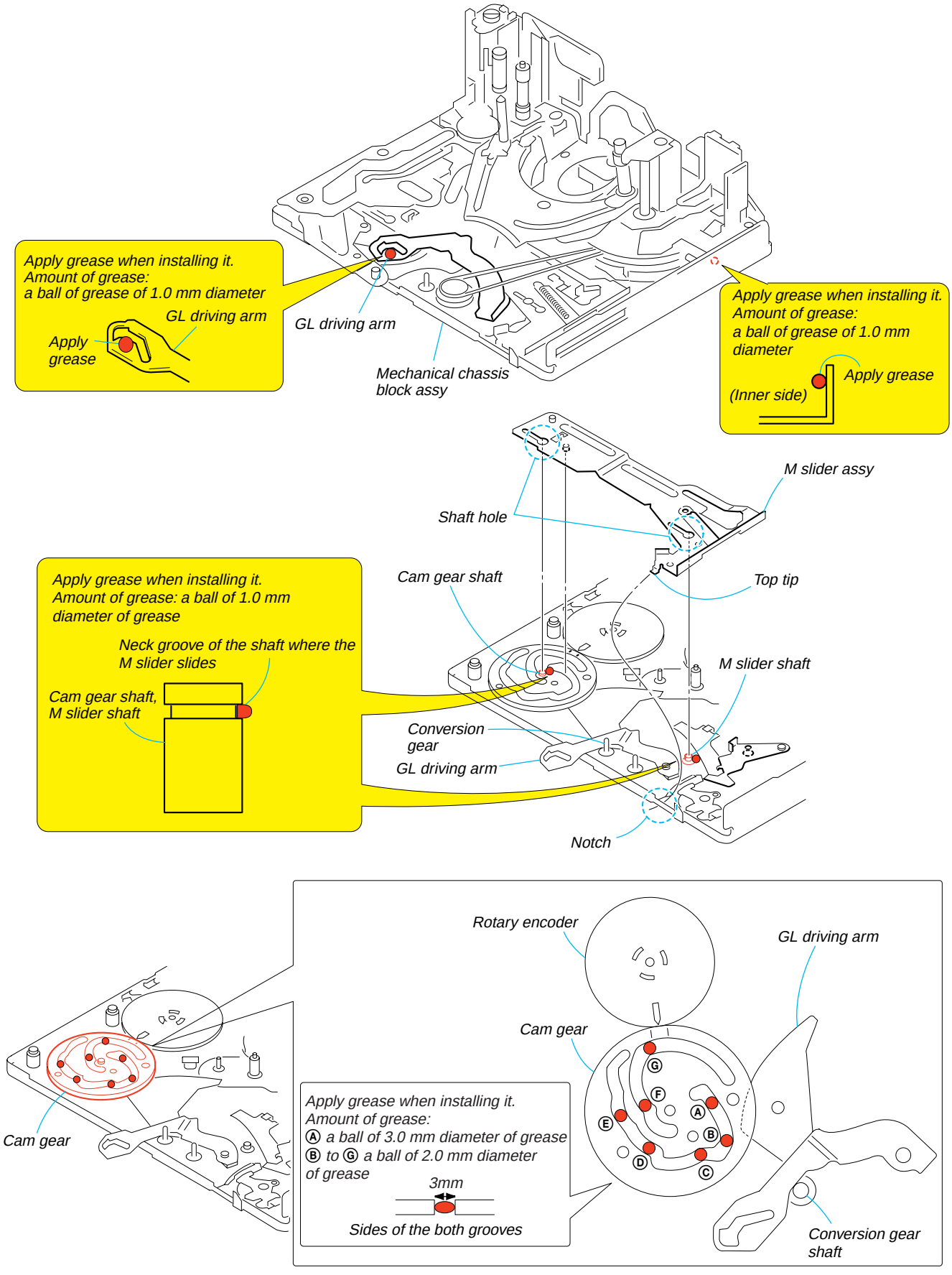
Apply grease in parallel with the side (red line)



LS arm shaft



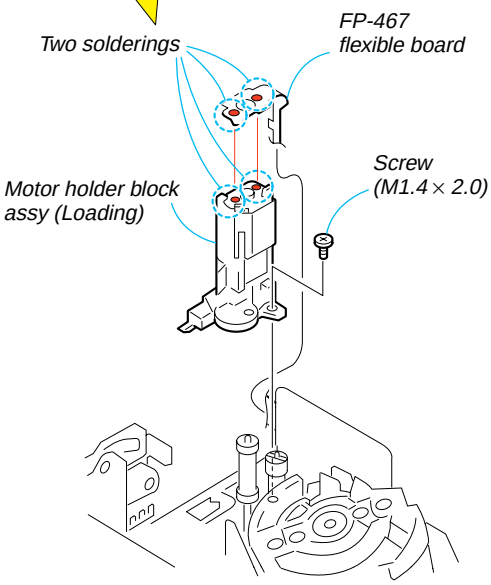
Apply grease (3)

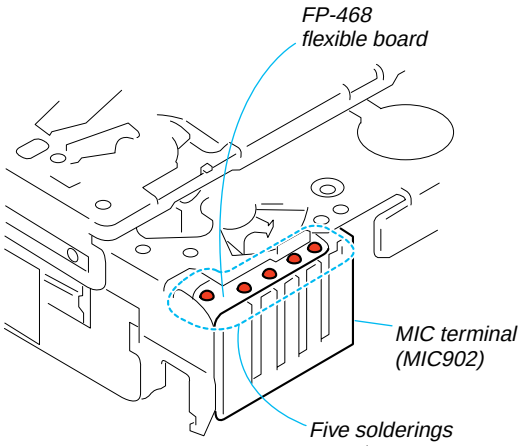

Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
GL driving arm
Apply grease
GL driving arm
Mechanical chassis block assy
Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
Apply grease
(Inner side)
M slider assy
Shaft hole
Top tip
Cam gear shaft
M slider shaft
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
Neck groove of the shaft where the M slider slides
Cam gear shaft, M slider shaft
Conversion gear
GL driving arm
Notch
Rotary encoder
GL driving arm
Cam gear
Cam gear
Apply grease when installing it.
Amount of grease:
Ⓐ a ball of 3.0 mm diameter of grease
Ⓑ to Ⓖ a ball of 2.0 mm diameter of grease
3mm
Sides of the both grooves
Conversion gear shaft

Soldering (1)

Lead-free solder
Wire type : ∅0.6
Temperature of the soldering iron tip : 320 °C
Contacting time of soldering iron tip : within 2 sec.

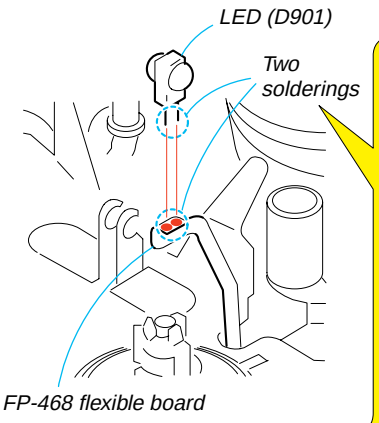
- Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
- Be careful not to melt the detent of the holder.
- Be careful not to melt the END cover.
- Be careful not to break the terminals due to attaching the soldering iron too long time.



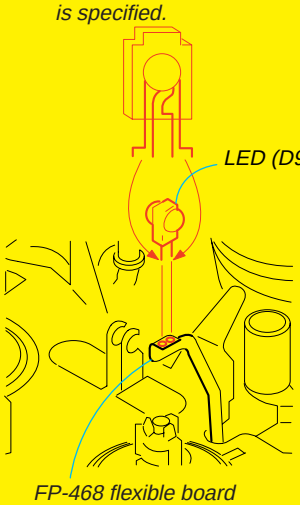


Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

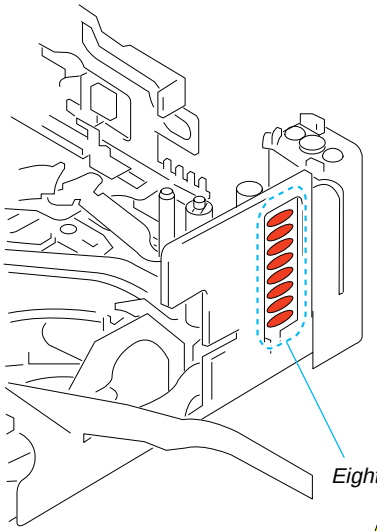
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec



Direction of the terminal is specified.



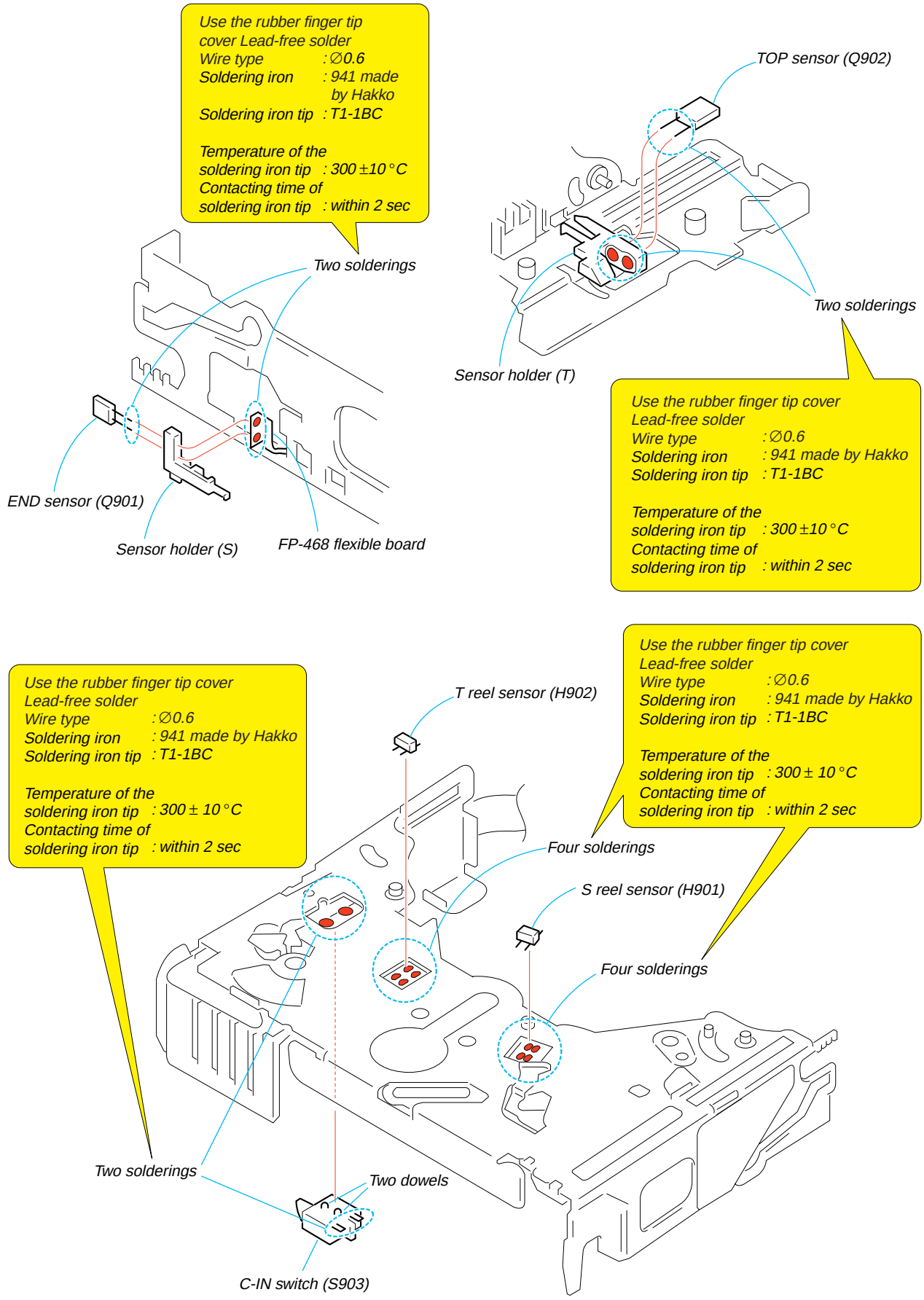
Rubber finger tip protection cover must be used.
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Soldering iron tip: T1-1BC
Temperature of the soldering iron tip: 300 ±10 °C
Contacting time of soldering iron tip: within 2 sec.



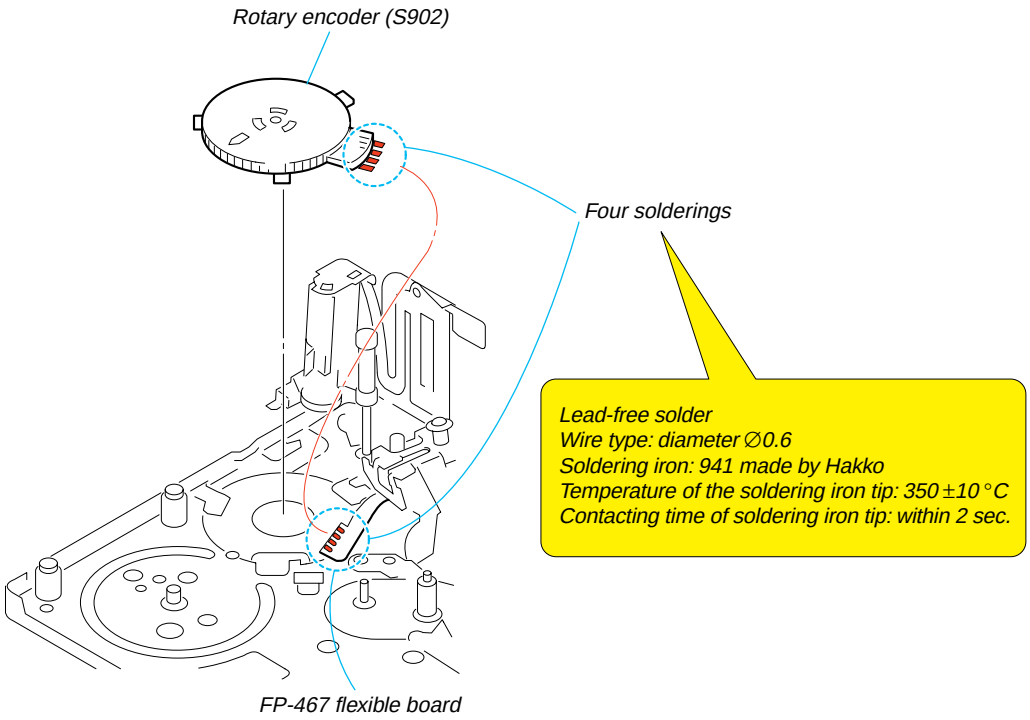
Lead-free solder
Wire type: diameter 0.6 ∅
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.

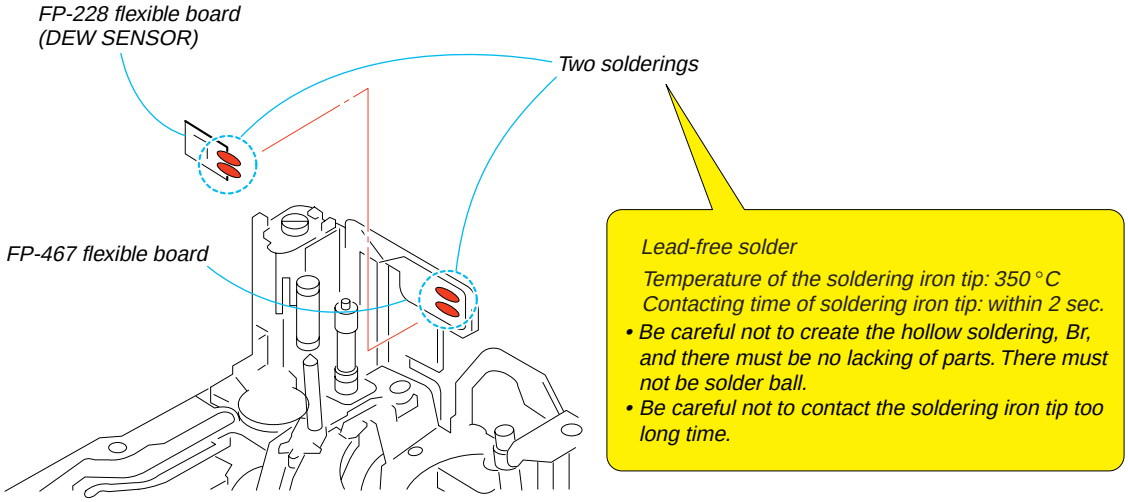
- Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
- Be careful not to crash the grip jog to the TG1 guide.

Soldering (2)

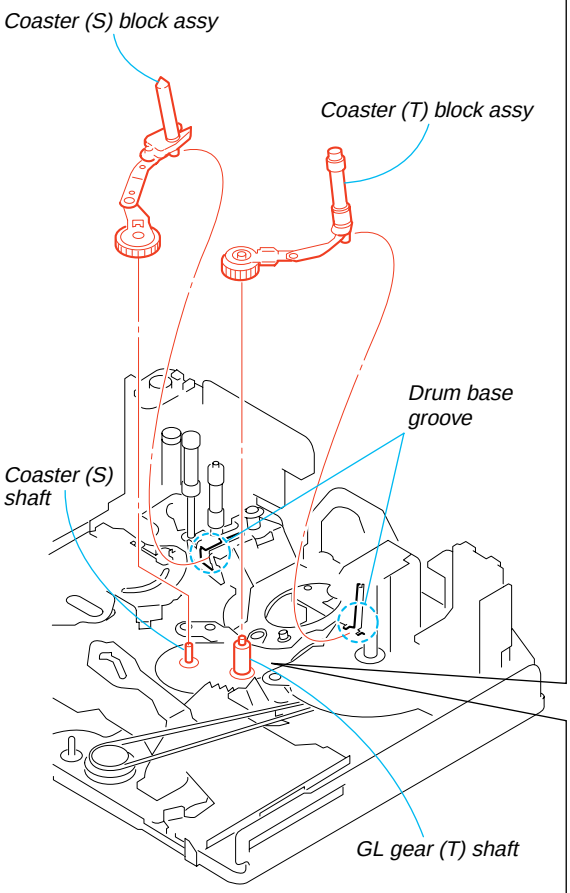

Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec
Two solderings
END sensor (Q901)
Sensor holder (S)
FP-468 flexible board
TOP sensor (Q902)
Two solderings
Sensor holder (T)
Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec
Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ± 10 °C
Contacting time of soldering iron tip : within 2 sec
T reel sensor (H902)
Four solderings
S reel sensor (H901)
Four solderings
Two solderings
Two dowels
C-IN switch (S903)

Soldering (3)

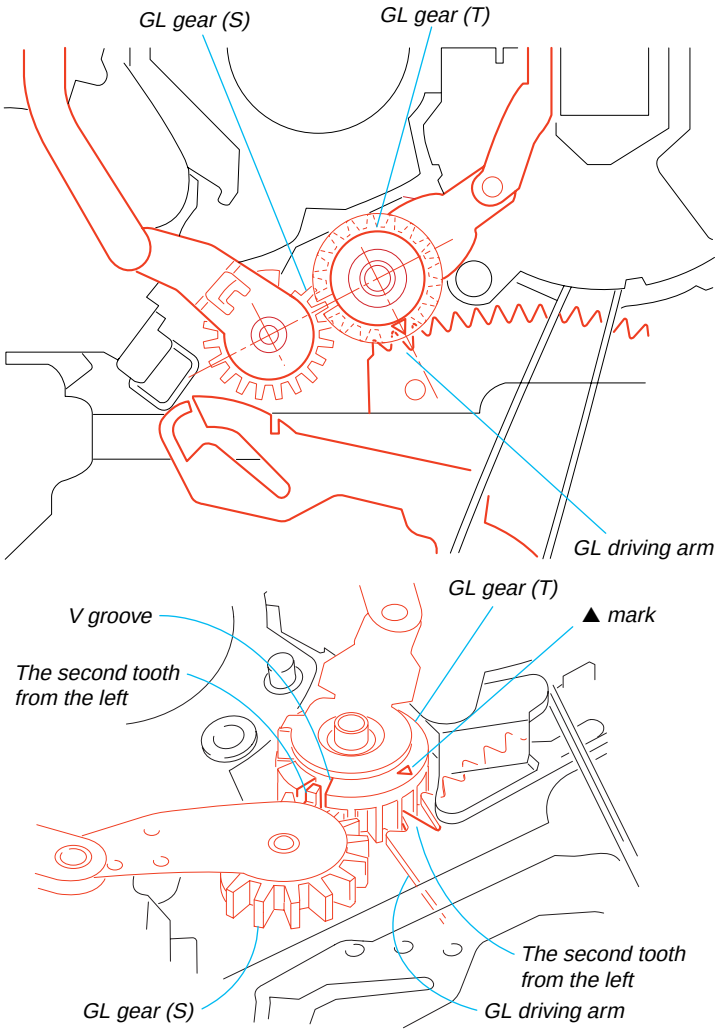

Rotary encoder (S902)
Four solderings
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Temperature of the soldering iron tip: 350 ±10 °C
Contacting time of soldering iron tip: within 2 sec.
FP-467 flexible board


FP-228 flexible board
(DEW SENSOR)
Two solderings
FP-467 flexible board
Lead-free solder
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.
• Be careful not to create the hollow soldering, Br, and there must be no lacking of parts. There must not be solder ball.
• Be careful not to contact the soldering iron tip too long time.

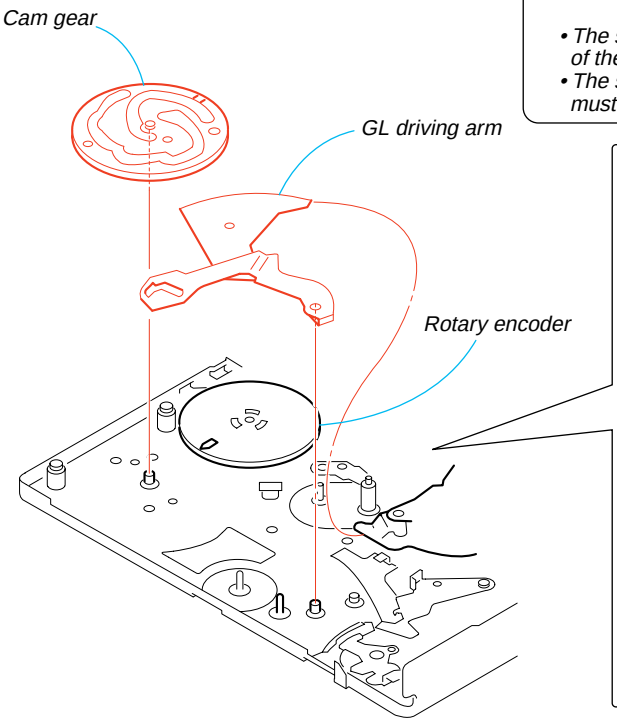
Matching Phase

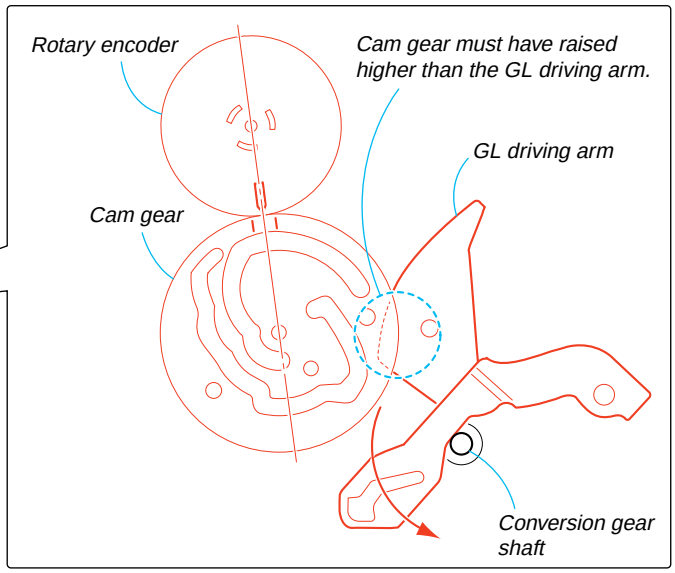


When re-assembling, adjust the gear phase at the three positions.



- The second tooth from the left of the GL gear (S) and the V-groove of the GL gear (T) must be in phase.
- The second tooth from the left of the GL drive arm and the ▲ mark must be in phase.





4. Adjustment

4-1. FWD Position Adjustment

When the TG2 arm block assy or the band adjuster or the S reel table assy is replaced or removed, the following adjustment becomes necessary.

- TG2 FWD Position Adjustment (Refer to section 4-4.)
- FWD Back Tension Adjustment (Refer to section 4-4.)
- Reel Table (RVS) Check (Refer to section 4-2.)

1) Set the R/P mode and check the TG2 guide position as follows.
   - Confirm that the distance between the TG2 guide and the L motor is 1.0 mm. If not, perform adjustment as follows.
2) Loosen the fixing screw. Use the adjustment screwdriver (Ref No. J-8) and adjust the band adjuster for the distance of 1.0 mm between the TG2 guide and the L motor. Upon completion of adjustment, tighten the fixing screw securely as follows.
   Tightening torque: 0.059 ± 0.01 N•m (0.6 ± 0.1 kgf•cm)
   Note: Upon completion of adjustment, confirm that TG2 can move with some margin in the direction of the arrow Ⓐ.

4-2. Reel Torque Check

1. Check Procedure

[FWD torque]

1) Set the mini DV torque cassette (Ref. No. J-6).
2) Establish the FWD mode. Confirm that the center value of the T reel table torque value is in the range of 0.49 to 0.93 (mN•m) (5.0 to 9.5 g•cm) within deviation of 0.39 (mN•m) (4.0 g•cm)

[RVS torque]

1) Set the mini DV torque cassette (Ref. No. J-6).
2) Establish the RVS mode. Confirm that the center value of the S reel table torque value is in the range of 1.57 to 2.45 (mN•m) (16.0 to 25.0 g•cm)

If the above specification is not satisfied, check the tension regulator band for correct operation. If operation of the tension regulator band has no problem, replace the respective reel tables.

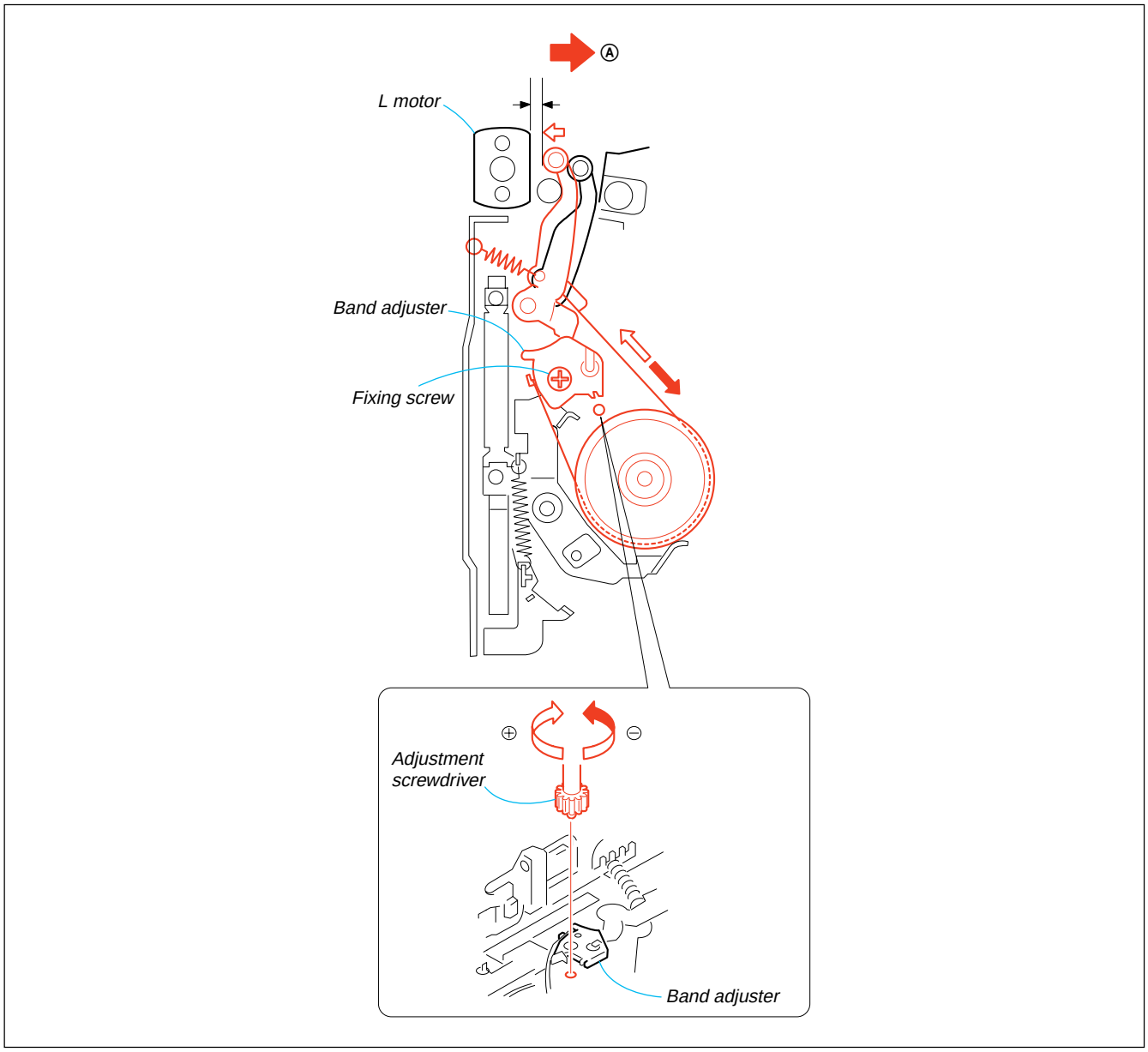


Fig. 4-1

4-3. LS Cam Plate Position Adjustment

1. Adjustment Procedure

1) Loosen the LS cam plate fixing screw (special head screw M1.4 × 1.4) by 180 degrees.
2) Set the STOP mode.
3) While pressing the center of the LS chassis block with the force of 1.5 ± 0.5 N (150 gf ± 50 gf), move the LS cam plate toward the S reel side with the force of 0.147 ± 0.01 N•m (2300 gf ± 200 gf) and tighten the LS cam plate fixing screw (special head screw M1.4 × 1.4) ①.
   Tightening torque: 0.098 ± 0.01 N•m (1.0 ± 0.1 kgf•cm)

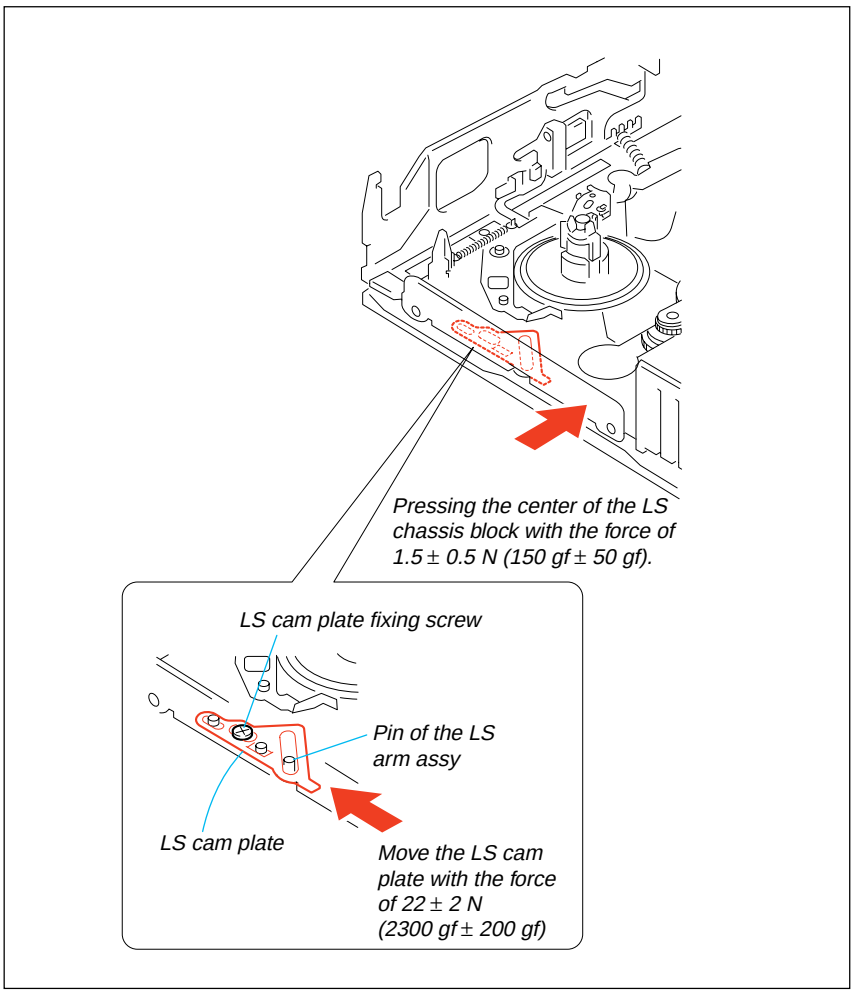

Pressing the center of the LS chassis block with the force of 1.5 ± 0.5 N (150 gf ± 50 gf).
LS cam plate fixing screw
Pin of the LS arm assy
LS cam plate
Move the LS cam plate with the force of 22 ± 2 N (2300 gf ± 200 gf)

Fig. 4-2

4-4. Tape Path Adjustment

4-1. Adjustment Preparation

1) Clean the tape running surface (tape guides, drum, capstan, pinch roller) referring to section 2-2.
2) Connect the adjustment remote commander (Ref. No. J-13) to the LANC terminal of the machine. Set the HOLD switch to ON.
3) Connect an oscilloscope to CN1004 of the VC-312 board via the CPC-7 jig (J-6082-382-A). (In the case of DCR-TRV22K)
   Oscilloscope CH1: VC-312 board CN1004 pin② (Note 1)
   EXT. TRIG: VC-312 board CN1004 pin④
   Note 1: Connect CN1004 pin② and pin⑥ (GND) with a 75-ohm resistor (1-247-804-11).
4) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
5) Select page: 0, address: 10 and set data: 00. (Note 2)
6) Select page: 3, address: 26 and set data: 31, and press the PAUSE button. (Note 2)
7) Select page: 3, address: 33 and set data: 08. (Note 2)
8) Confirm that the RF waveform on the scope is flat at both of the entrance side and the exit side. (Refer to Fig. 4-4A.)
   If the RF waveform is not flat either at the entrance side or the exit side (refer to Fig. 4-4 B and C), perform the adjustment of section 6-2 and later.
9) When the required conditions of step 8) are satisfied, perform [Required Work upon Completion of Adjustment] as described below upon completion of adjustment/check.

[Required Work upon Completion of Adjustment]

1) Connect the adjustment remote commander (Ref. No. J-13) to the LANC terminal of the machine. Set the HOLD switch to ON.
2) Select page: 0, address: 10 and set data: 00. (Note 2)
3) Select page: 3, address: 26 and set data: 00, and press the PAUSE button. (Note 2)
4) Select page: 3, address: 33 and set data: 00. (Note 2)
   Note 2: Page and address numbers differ depending on each model. Please to Service Manual of the respective models. Page and address numbers of DCR-TRV22K are shown in this manual.

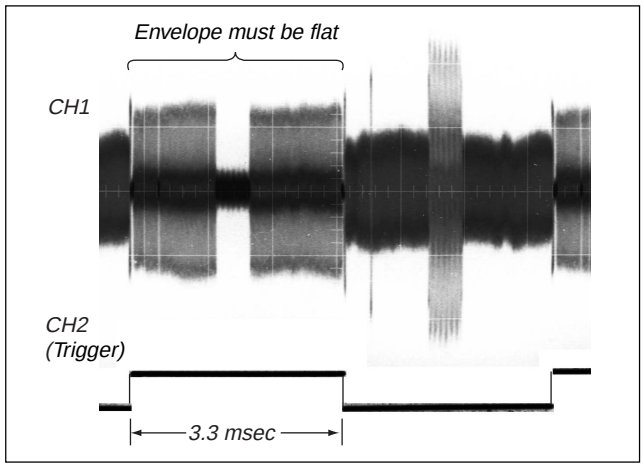


Fig. 4-3

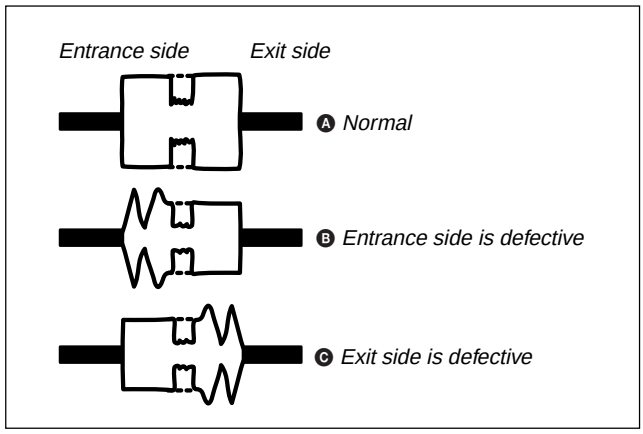


Fig. 4-4

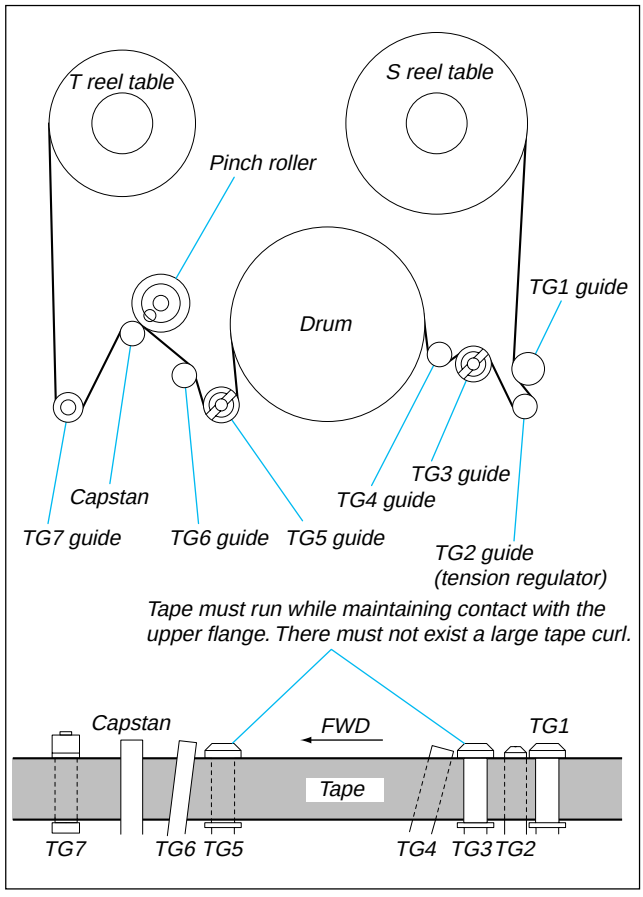


Fig. 4-5

4-2. TG3/TG5 Guide Coarse Adjustment

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Adjust the TG3 and TG5 guides until the RF envelope waveform becomes flat. (Refer to Fig. 4-8.)

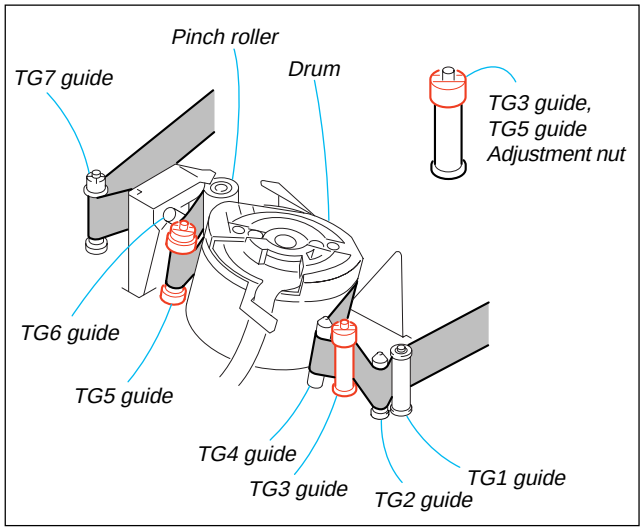


Fig. 4-6

4-3. FWD Back Tension Adjustment

1) Set the mini DV torque cassette (Ref. No. J-6) and establish the FWD mode.
2) Confirm that the S side torque cassette reading value is in the range of 0.2 to 0.3 mN•m (2.0 to 3.0 g•cm) including deviation. If the measurement value does not satisfy the specifications, perform the following adjustment.
   - If the measurement value is higher than the specification: (Decreases the spring tension)
     Move the tension coil spring hook to another spring stay in the direction of Ⓑ.
   - If the measurement value is lower than the specification: (Increases the spring tension)
     Move the tension coil spring hook to another spring stay in the direction of Ⓐ.

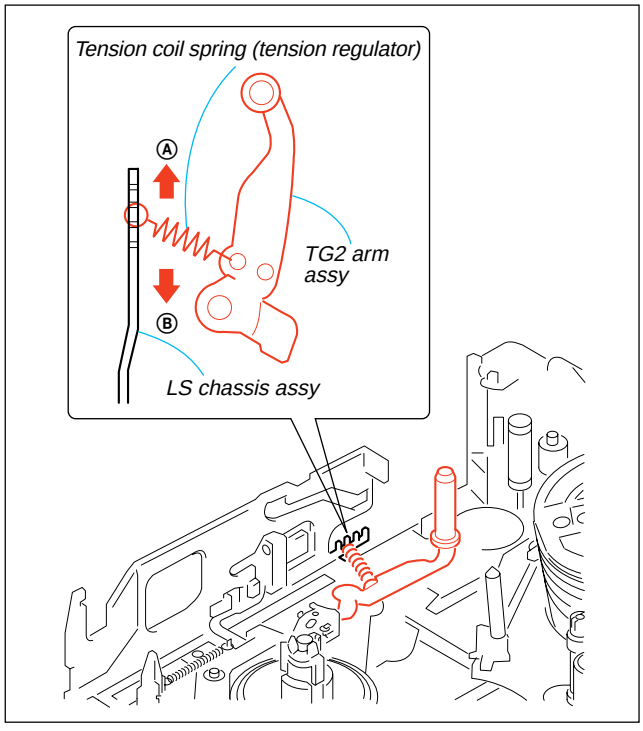


Fig. 4-7

4-4. TG3/TG5 Guide Fine Adjustment

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Adjust the TG3 so that the RF envelope has the larger amplitude at the entrance side first, than adjust TG3 guide for flat amplitude. (Refer to Fig. 4-8.)
3) Adjust the TG5 so that the RF envelope has the larger amplitude at the exit side first, than adjust TG5 guide for flat amplitude. (Refer to Fig. 4-9.)

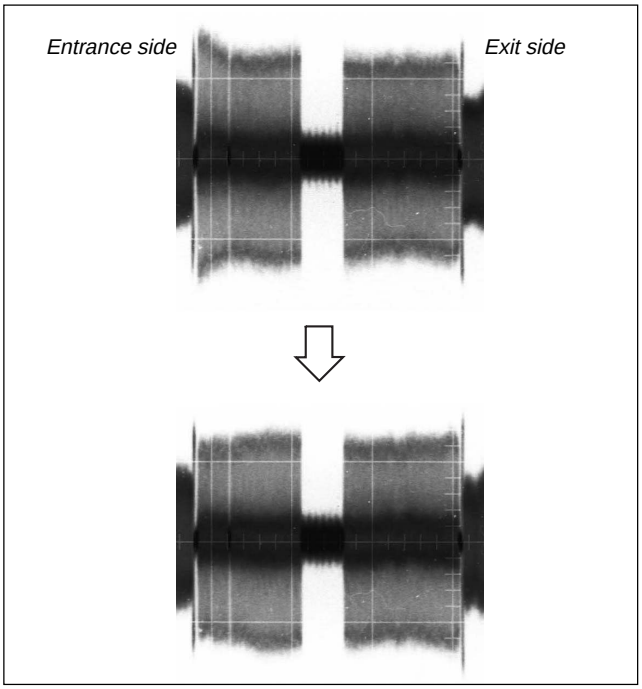


Fig. 4-8

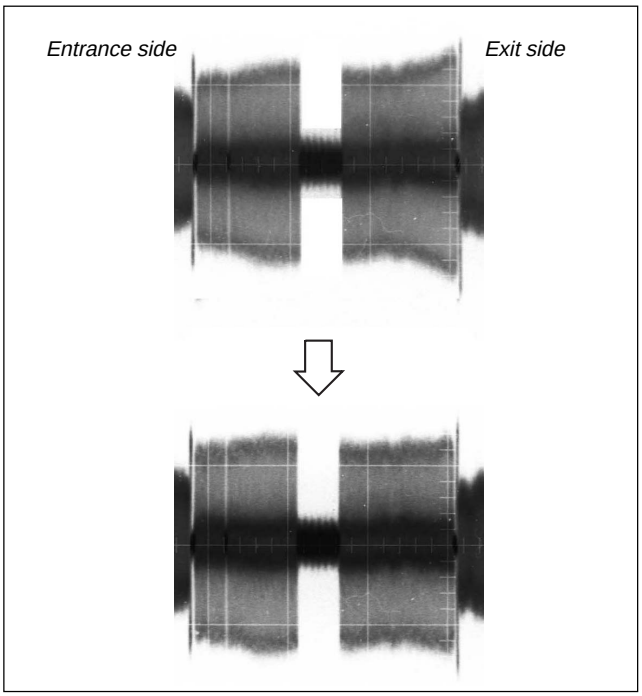


Fig. 4-9

4-5. Tape Run Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5). Establish the CUE mode first then the REV mode. Confirm in the respective modes that there are no large tape curls at the upper flange of TG3 and TG5. Then confirm in the respective modes that there are no large tape curls at the upper and lower flanges of TG1 and TG7.

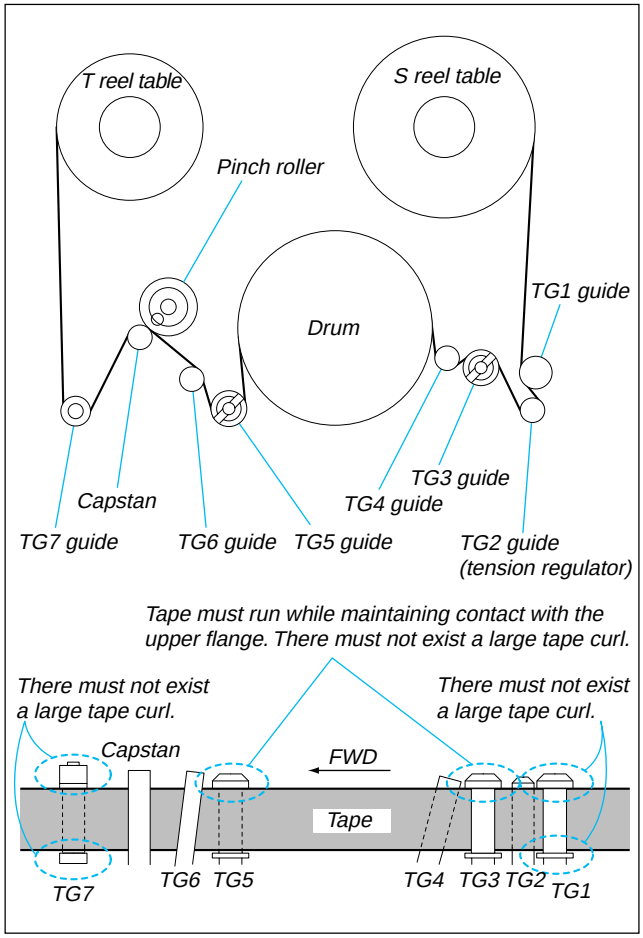


Fig. 4-10

4-6. Check upon Completion of Adjustment

1. Tracking Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Establish the CUE (or REV) mode. Take the amplitude (A) in this mode as the 100% waveform amplitude. (Refer to Fig. 4-11.)
3) Establish the FWD mode. Confirm that the difference between the minimum (E min) and the maximum (E max) is less than 30%. (When taking the amplitude (A) in the CUE or REV mode as 100%)

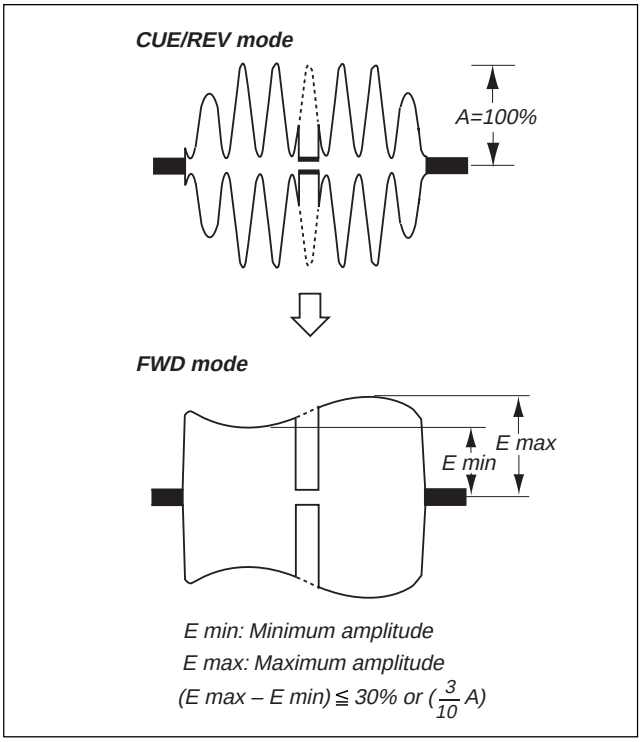


Fig. 4-11

4) Confirm that the RF waveform does not have excessive fluctuation of amplitude. (Fluctuation of amplitude should be 10% or less at both entrance side (B) and exit side (C), when taking the amplitude (A) in the CUE or REV mode as 100%)

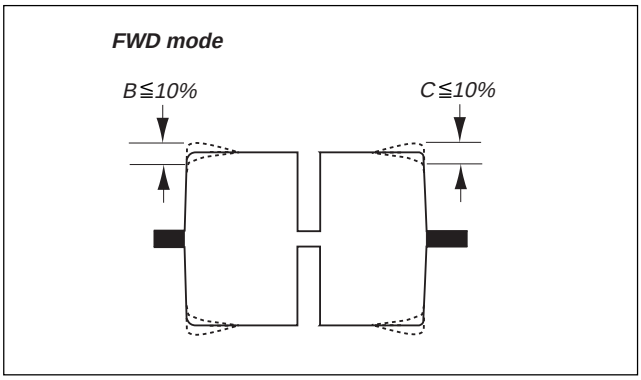


Fig. 4-12

2. CUE/REV Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Establish the CUE mode. Confirm that the pitches between the peaks of the RF waveform are equally spaced. Also confirm that the RF waveform amplitude at entrance side (B) and exit side (C) is 50% or more respectively, when taking the amplitude (A) in the CUE or REV mode as 100%.
3) Establish the REV mode. Confirm that the pitches between the peaks of the RF waveform are equally spaced. Also confirm that the RF waveform amplitude at entrance side (B) and exit side (C) is 50% or more respectively.

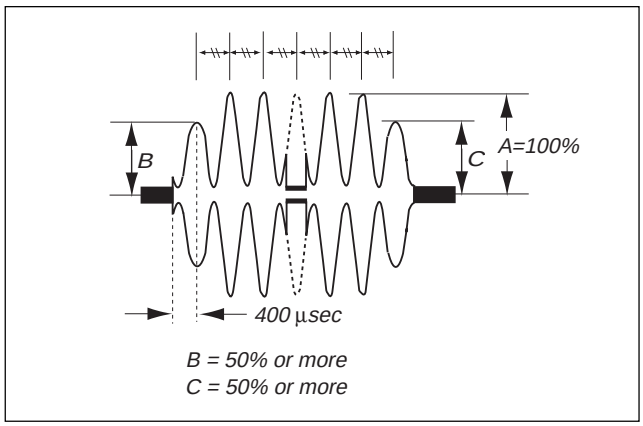


Fig. 4-13

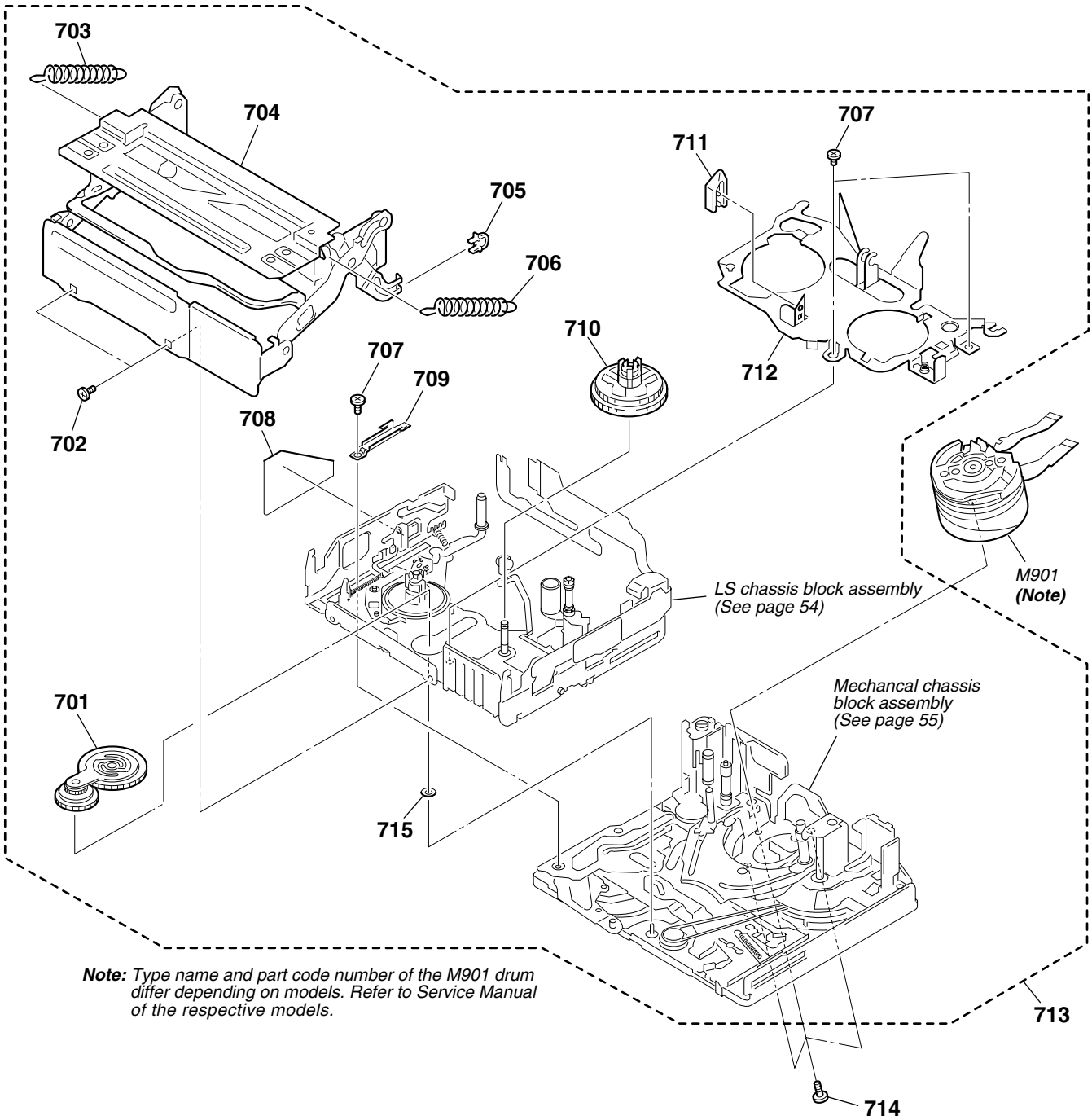
3. Rise-up Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Change the modes from CUE mode to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from CUE mode to FWD.
3) Change the modes from REV mode (two seconds or more of REV and to the FWD within five seconds) to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from REV mode to FWD.
4) Change the modes from STOP mode to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from STOP mode to FWD.

5. Exploded Views

NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

5-1. Overall Mechanism Deck Section (Z100)

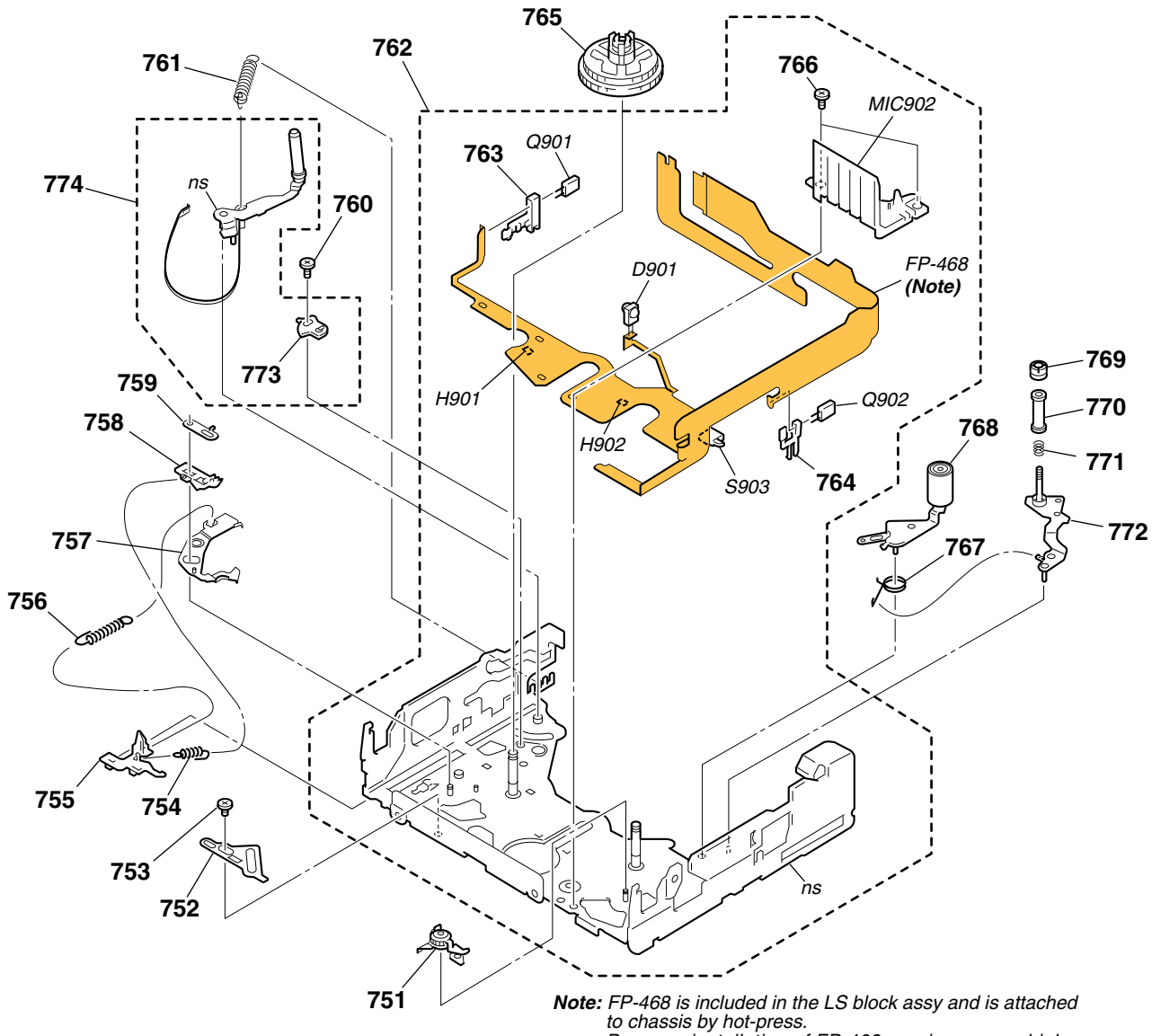


Note: *Type name and part code number of the M901 drum differ depending on models. Refer to Service Manual of the respective models.*

Ref. No.	Part No.	Description
701	X-3952-938-3	GEAR ASSY, GOOSENECK
702	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
703	3-079-206-02	SPRING (POP UP S), EXTENSION
704	X-3952-939-3	COMPARTMENT ASSY, CASSETTE
705	3-079-367-01	DAMPER, CASSETTE COMPARTMENT
706	3-079-215-02	SPRING (POP UP T), EXTENSION
707	3-703-816-15	SCREW (M1.4), SPECIAL HEAD
708	3-080-545-01	COVER, SENSOR S
709	3-079-364-01	RETAINER, LS GUIDE
710	X-3952-937-1	TABLE ASSY, T REEL
711	3-079-366-01	RELEASE, REEL LOCK
712	X-3953-257-1	PLATE ASSY, RETAINER
713	A-7095-393-A	MD (Z100) SUB ASSY
714	3-079-741-02	SCREW,DRUM FIXING
715	3-748-682-01	WASHER,T
M901	– Note –	DRUM (DEH-30A-R)(SERVICE)

5-2. LS Chassis Block Assembly

ns : not supplied



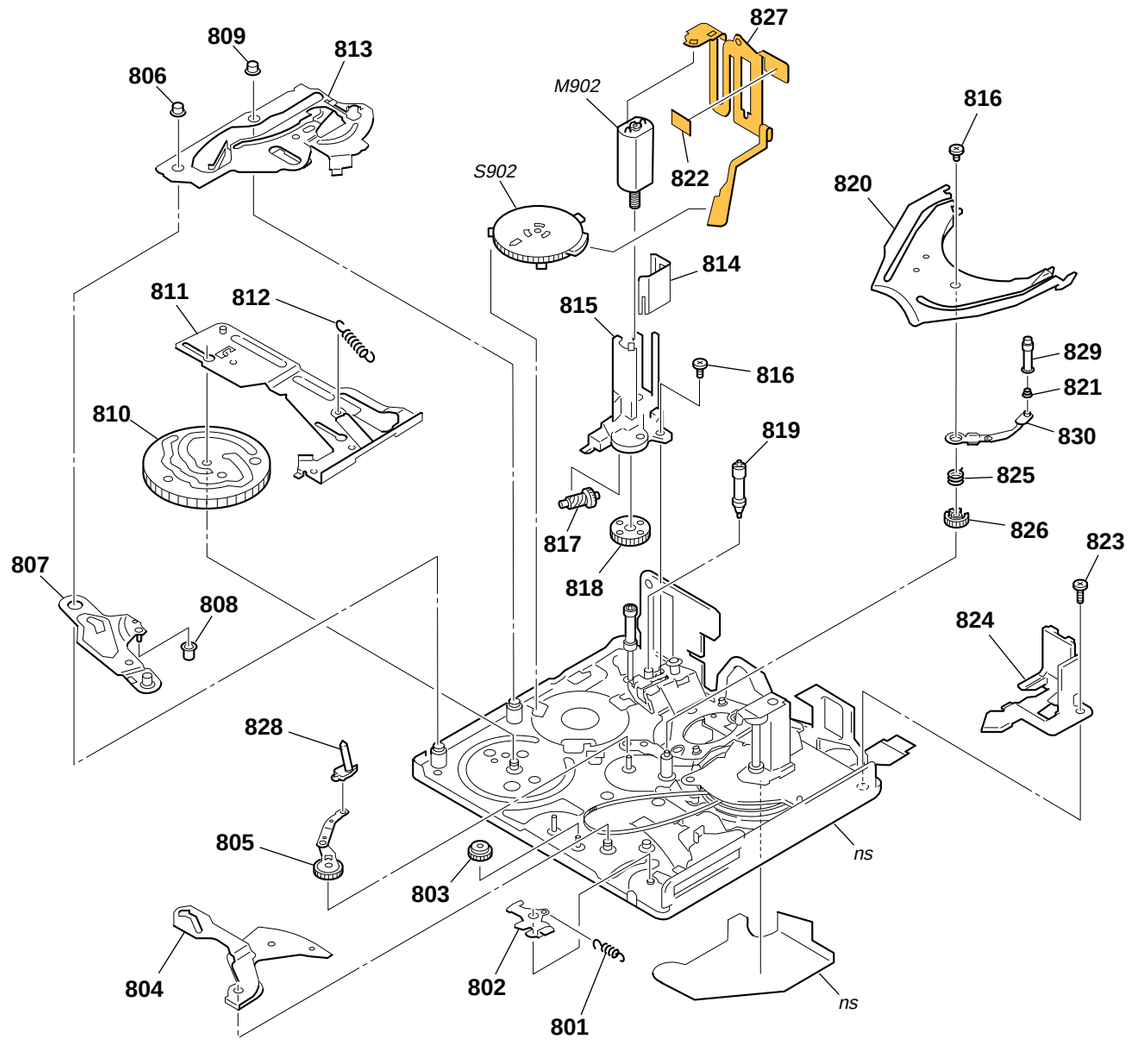
Note: *FP-468 is included in the LS block assy and is attached to chassis by hot-press.*
Because installation of FP-468 requires a very high accuracy, FP-468 is not supplied as an independent service parts.

Ref. No.	Part No.	Description
751	A-7095-402-B	BRAKE (T) BLOCK ASSY
752	3-079-241-01	PLATE, LS CAM
753	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
754	3-079-246-01	SPRING (RELEASE RACK),EXTENSION
755	3-079-248-01	POSITIONING (S), CASSETTE
756	3-079-244-01	SPRING (ULE), EXTENSION
757	X-3952-932-1	BRAKE ASSY, ULE
758	3-079-245-01	RACK (S), RELEASE
759	3-079-247-01	BRAKE (S)
760	3-059-090-11	SCREW (M1.4X2.5), SPECIAL HEAD
761	3-079-242-01	SPRING, TENSION (TENSION REGULATOR)
762	A-7095-401-A	LS BLOCK ASSY
763	3-079-267-01	HOLDER (S), SENSOR
764	3-079-268-01	HOLDER (T), SENSOR
765	X-3952-936-2	TABLE ASSY, S REEL

Ref. No.	Part No.	Description
766	3-703-816-15	SCREW (M1.4), SPECIAL HEAD
767	3-079-243-01	SPRING (PINCH RETURN), TORSION
768	X-3952-934-1	ARM ASSY, PINCH
769	3-052-062-02	NUT, TG7
770	3-079-219-02	TG7
771	3-081-591-01	SPRING, COMPRESSION (TG7)
772	X-3952-935-3	ARM ASSY, TG7
773	3-079-237-01	ADJUSTOR, BAND
774	A-7095-403-B	TG2 ARM BLOCK ASSY
D901	6-500-471-01	DIODE GL453E00000F (TAPE LED)
H901	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (S REEL)
H902	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (T REEL)
MIC902	1-817-175-12	PIN, CONNECTOR (WITH DETECTION SWITCH)
S903	1-529-566-51	SWITCH, PUSH (1 KEY) (C.C. DOWN)
Q901	6-550-402-01	TRANSISTOR PT4850FE000F (TAPE END)
Q902	6-550-402-01	TRANSISTOR PT4850FE000F (TAPE TOP)

5-3. Mechanical Chassis Block Assembly

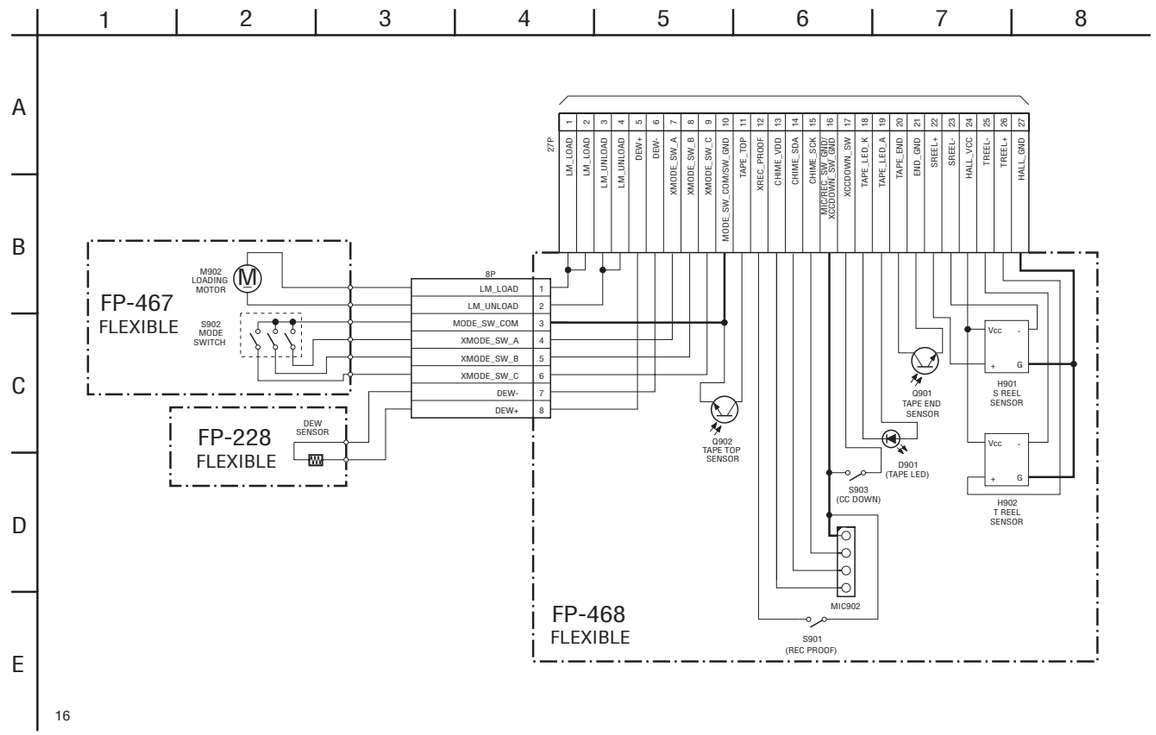
ns : not supplied



Ref. No.	Part No.	Description
801	3-079-314-01	SPRING (EJ), EXTENSION
802	3-079-327-01	ARM, EJ
803	3-079-323-02	GEAR, CONVERSION
804	3-079-324-02	ARM, GL DRIVING
805	X-3952-928-1	GL (S) ASSY
806	3-079-315-01	ROLLER (S1), LS GUIDE
807	X-3952-925-1	ARM ASSY, LS
808	3-079-320-01	ROLLER, LS
809	3-079-316-01	ROLLER (S2), LS GUIDE
810	3-079-319-01	GEAR, CAM
811	X-3952-941-1	SLIDER ASSY, M
812	3-079-321-02	SPRING (PINCH), EXTENSION
813	X-3952-940-2	PLATE ASSY, TG2 CAM
814	3-079-312-01	SHIELD, MOTOR
815	3-079-307-01	HOLDER, MOTOR
816	3-703-816-15	SCREW (M1.4), SPECIAL HEAD

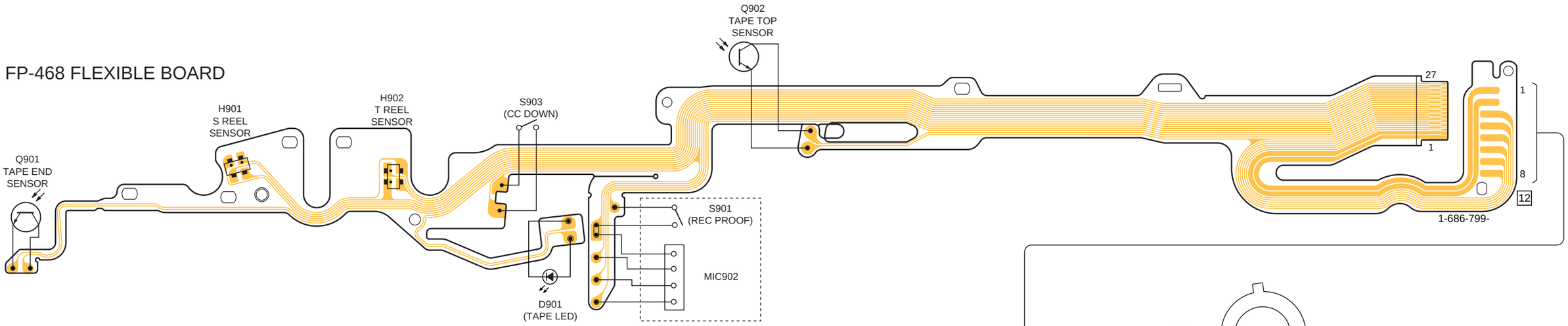
Ref. No.	Part No.	Description
817	3-079-308-01	SHAFT, WORM
818	3-079-309-01	GEAR, DECELERATION
819	X-3952-942-2	ROLLER ASSY, TG3
820	3-079-325-01	RAIL, GUIDE
821	3-079-295-02	SPRING, TG5
822	1-677-049-11	FP-228 FLEXIBLE BOARD (DEW SENSOR)
823	3-079-328-01	SCREW ,SPECIAL (EG GRIP)
824	3-079-326-02	SUPPORT, TG7
825	3-079-301-01	SPRING (GLT), TORSION
826	3-079-298-01	GEAR (T), GL
827	1-686-798-11	FP-467 FLEXIBLE BOARD
828	X-3952-927-2	COASTER (S) ASSY
829	X-3952-930-3	ROLLER ASSY, TG5
830	X-3952-929-3	COASTER (T) ASSY
M902	A-7095-396-A	MOTOR BLOCK ASSY, L (LOADING)
S902	1-477-679-11	ROTARY, ENCODER (SWITCH)

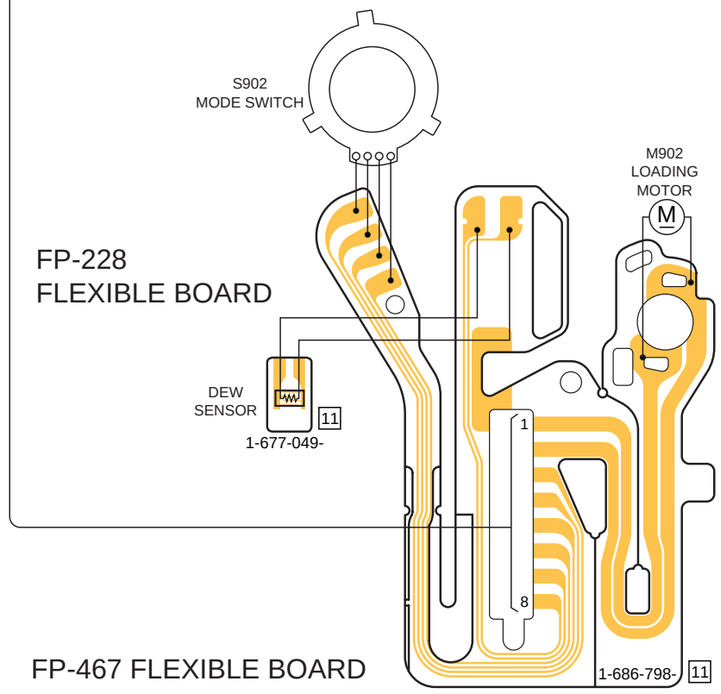
6. Schematic Diagrams



16

7. Printed Wiring Boards





2003A1600-1
©2003.1
Published by DI Customer Center

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2003.01	Official Release	—	—

DCR-HC17E/HC19E/HC21/HC21E/HC22E/ HC32/HC32E/HC33/HC33E

RMT-830/831

Ver 1.0 2005.01
Revision History

SECTION 6 ADJUSTMENTS

ADJ

Link

- Before starting adjustments
  - Adjusting items when replacing main parts and boards (Non MS model)
  - Adjusting items when replacing main parts and boards (MS model)
- CAMERA SECTION ADJUSTMENTS
  - PREPARATIONS BEFORE ADJUSTMENTS
  - INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA (Non MS model)
  - INITIALIZATION OF 8, A, B, C, D, E, F, 18, 1A, 1B, 1C, 1E, 1F PAGE DATA (MS model)
  - CAMERA SYSTEM ADJUSTMENTS
  - ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS
  - LCD SYSTEM ADJUSTMENTS
- MECHANISM SECTION ADJUSTMENTS
  - HOW TO ENTER RECORD MODE WITHOUT CASSETE
  - HOW TO ENTER PLAYBACK MODE WITHOUT CASSETE
  - TAPE PATH ADJUSTMENT
- VIDEO SECTION ADJUSTMENTS
  - PREPARATIONS BEFORE ADJUSTMENTS
  - SYSTEM CONTROL SYSTEM ADJUSTMENTS
  - SERVO AND RF SYSTEM ADJUSTMENTS
  - VIDEO SYSTEM ADJUSTMENTS
  - AUDIO SYSTEM ADJUSTMENTS (Non MS model)
  - AUDIO SYSTEM ADJUSTMENTS (MS model)
- SERVICE MODE
  - ADJUSTMENT REMOTE COMMANDER
  - DATA PROCESS
  - SERVICE MODE

NON MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

SONY®

DCR-HC17E/HC19E/HC21/HC21E/HC22E/HC32/HC32E/HC33/HC33E

9-876-782-51

Sony EMCS Co.

2004L0500-1

© 2004.12

Published by DI Technical Support Section

TABLE OF CONTENTS

Section	Title	Page
6.	**ADJUSTMENTS**	
1.	Before Starting Adjustments	6-1
1-1.	Adjusting Items when Replacing Main Parts and Boards (Non MS model)	6-2
1-2.	Adjusting Items when Replacing Main Parts and Boards (MS model)	6-4
6-1.	Camera Section Adjustments	6-6
1-1.	Preparations before Adjustments (CAMERA Section)	6-6
1-1-1.	List of Service Tools	6-6
1-1-2.	Preparations	6-7
1-1-3.	Precaution	6-8
1.	Setting the Switch	6-8
2.	Order of Adjustments	6-8
3.	Subjects	6-9
4.	Preparing the Flash Adjustment Box	6-10
1-2.	Initialization of 8, A, C, D, E, F, 1C, 1F Page Data (Non MS model)	6-11
1-2-1.	Initialization of A, D Page Data	6-11
1.	Initializing of A, D Page Data	6-11
2.	Modification of A, D Page Data	6-11
3.	A Page Table	6-12
4.	D Page Table	6-12
1-2-2.	Initialization of 8, C, 1C Page Data	6-13
1.	Initializing of 8, C, 1C Page Data	6-13
2.	Modification of 8, C, 1C Page Data	6-13
3.	8 Page Table	6-14
4.	C Page Table	6-14
5.	1C Page Table	6-15
1-2-3.	Initialization of E, F, 1F Page Data	6-16
1.	Initializing of E, F, 1F Page Data	6-16
2.	Modification of E, F, 1F Page Data	6-16
3.	E Page Table	6-17
4.	F Page Table	6-17
5.	1F Page Table	6-19
1-3.	Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F Page Data (MS model)	6-20
1-3-1.	Initialization of A, B, D, 1A, 1B Page Data	6-20
1.	Initializing of A, B, D, 1A, 1B Page Data	6-20
2.	Modification of A, B, D, 1A, 1B Page Data	6-20
3.	A Page Table	6-21
4.	B Page Table	6-21
5.	D Page Table	6-21
6.	1A Page Table	6-22
7.	1B Page Table	6-22
1-3-2.	Initialization of 8, C, 18, 1C Page Data	6-23
1.	Initializing of 8, C, 18, 1C Page Data	6-23
2.	Modification of 8, C, 18, 1C Page Data	6-23
3.	8 Page Table	6-24
4.	C Page Table	6-25
5.	18 Page Table	6-26
6.	1C Page Table	6-27
1-3-3.	Initialization of E, F, 19, 1E, 1F Page Data	6-28
1.	Initializing of E, F, 19, 1E, 1F Page Data	6-28
2.	Modification of E, F, 19, 1E, 1F Page Data	6-28
3.	E Page Table	6-29
4.	F Page Table	6-29
5.	19 Page Table	6-31
6.	1E Page Table	6-31
7.	1F Page Table	6-32
1-4.	Camera System Adjustments	6-33
1.	36MHz Origin Oscillation Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-33
2.	Hall Adjustment	6-34
3.	Flange Back Adjustment (Using the minipattern box or flange back adjustment jig)	6-35
4.	Flange Back Adjustment (Using the flange back adjustment chart and subject more than 500 m away)	6-36
4-1.	Flange Back Adjustment (1)	6-36
4-2.	Flange Back Adjustment (2)	6-37
5.	Flange Back Check	6-37
6.	Optical Axis Adjustment	6-38
7.	Picture Frame Setting (Color reproduction adjustment frame)	6-39
8.	Picture Frame Setting (Center frame)	6-40
9.	E.I. No. standard data input	6-40
10.	Mechanical Shutter Adjustment (DCR-HC32/HC32E/HC33/HC33E)	6-41
11.	Color Reproduction Adjustment	6-42
12.	Auto White Balance Standard Data Input	6-43
13.	LV Standard Data Input	6-43
14.	Auto White Balance Adjustment	6-44
15.	Auto White Balance Check	6-45
16.	MAX GAIN Adjustment	6-46
17.	Steadyshot Check	6-47
1-5.	Electronic Viewfinder System Adjustments	6-48
1.	EVF Automatic Adjustment (LB-109 board)	6-48
1-6.	LCD System Adjustments	6-49
1.	LCD Automatic Adjustment (PD-237 board)	6-49
2.	V-COM Adjustment (PD-237 board)	6-50
3.	Transmissive Mode White Balance Adjustment (PD-237 board)	6-50
2-2.	Mechanism Section Adjustments	6-51
2-1.	How To Enter Record Mode Without Cassette	6-51
2-2.	How To Enter Playback Mode Without Cassette	6-51
2-3.	Tape Path Adjustment	6-51
1.	Preparation for Adjustment	6-51
2.	Procedure After Operations	6-51
3-3.	Video Section Adjustments	6-52
3-1.	Preparations Before Adjustments	6-52
3-1-1.	Equipment Required	6-52
3-1-2.	Precautions on Adjusting	6-52
3-1-3.	Adjusting Connectors	6-52
3-1-4.	Connecting the Equipment	6-53
3-1-5.	Alignment Tapes	6-54
3-1-6.	Input/Output Level and Impedance	6-54
3-2.	System Control System Adjustments	6-55
1.	Initialization of 8, A, C, D, E, F, 1C,1F Page Data (Non MS model)	6-55
2.	Touch Panel Adjustment (Non MS model)	6-55
3.	Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F Page Data (MS model)	6-56
4.	Touch Panel Adjustment (MS model)	6-56
5.	Node Unique ID No. Input	6-57
3-3.	Servo and RF System Adjustments	6-59
1.	CAP FG Duty Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-59
2.	Switching Position Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-60
3.	Error Rate Check (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-61
3-1.	Preparations Before Adjustments	6-61
3-2.	Error Rate Check	6-61

Section	Title	Page
3-4.	Video System Adjustments	6-62
1.	S VIDEO OUT Y Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-62
2.	S VIDEO OUT Chroma Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-63
3.	VIDEO OUT Level Check (VC-376 board (Non MS model)) (VC-377 board (MS model))	6-64
3-5.	Audio System Adjustments (Non MS model)	6-65
1.	Playback Level Check	6-65
2.	Overall Level Characteristics Check	6-65
3.	Overall Distortion Check	6-66
4.	Overall Noise Level Check	6-66
5.	Overall Separation Check	6-66
3-6.	Audio System Adjustments (MS model)	6-67
1.	Playback Level Check	6-67
2.	Overall Level Characteristics Check	6-67
3.	Overall Distortion Check	6-68
4.	Overall Noise Level Check	6-68
5.	Overall Separation Check	6-68
6-4.	Service Mode	6-69
4-1.	Adjustment Remote Commander	6-69
1.	Using the Adjustment Remote Commander	6-69
2.	Precautions Upon Using the Adjustment Remote Commander	6-69
4-2.	Data Process	6-70
4-3.	Service Mode	6-71
1.	Setting the Test Mode	6-71
1-1.	Setting the Test Mode (Non MS model)	6-71
1-2.	Setting the Test Mode (MS model)	6-71
2.	Emergence Memory Address (Non MS model)	6-71
2-1.	Emergency Memory Address (Camera section)	6-71
2-2.	EMG Code (Emergency Code)	6-71
3.	Emergence Memory Address (MS model)	6-72
3-1.	Emergency Memory Address (Camera section)	6-72
3-2.	EMG Code (Emergency Code)	6-72
4.	Emergence Memory Address (Mechanism section)	6-72
4-1.	EMG Code (Emergency Code)	6-73
4-2.	MSW Code	6-74
5.	Bit Value Discrimination	6-75
6.	Jack Check (Non MS model)	6-75
6-1.	Jack Check (1) (Handycam station) (DCR-HC22E)	6-75
6-2.	Jack Check (2)	6-75
7.	Jack Check (MS model)	6-76
7-1.	Jack Check (1) (Handycam station)	6-76
7-2.	Jack Check (2)	6-76
8.	Switch Check (Non MS model)	6-76
8-1.	Switch Check (1)	6-76
8-2.	Switch Check (2)	6-76
8-3.	Switch Check (3)	6-77
8-4.	Switch Check (4)	6-77
9.	Switch Check (MS model)	6-78
9-1.	Switch Check (1)	6-78
9-2.	Switch Check (2)	6-78
9-3.	Switch Check (3)	6-78
9-4.	Switch Check (4)	6-79
10.	LED, IR Light Check (Non MS model)	6-80
11.	LED, IR Light Check (MS model)	6-80
12.	Record of Use Check (1)	6-80
13.	Record of Use Check (2) (Non MS model)	6-81
14.	Record of Use Check (3) (MS model)	6-82
15.	Record of Use Check (4)	6-82
16.	Record of Self-diagnosis Check	6-83

* The camera optical axis frame is shown on page 6-84.
The camera color reproduction frame is shown on page 6-85.

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

SECTION 6
ADJUSTMENTS

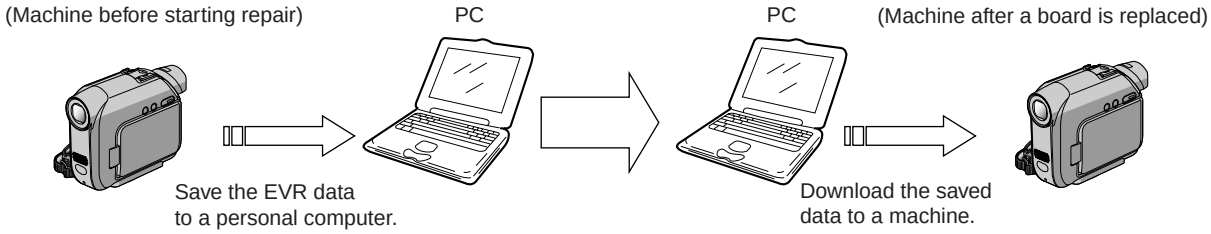
1. Before starting adjustments

EVR Data Re-writing Procedure When Replacing Board

The data that is stored in the repair board, is not necessarily correct.
Perform either procedure 1 or procedure 2 or procedure 3 when replacing board.

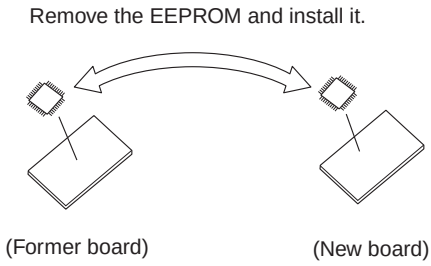
Procedure 1

Save the EVR data of the machine in which a board is going to be replaced. Download the saved data after a board is replaced.



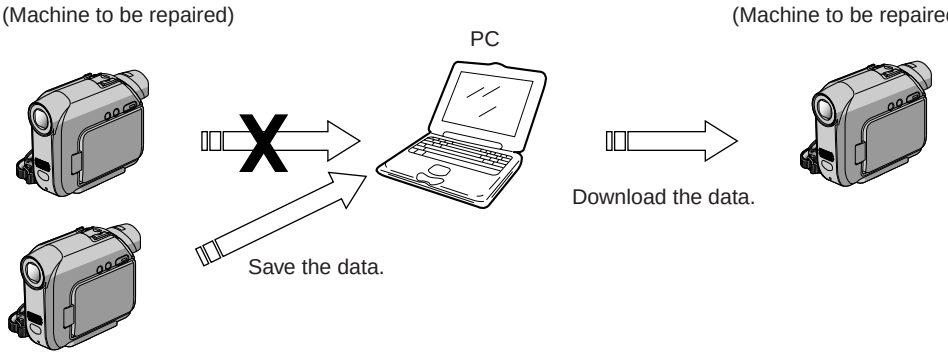
Procedure 2

Remove the EEPROM from the board of the machine that is going to be repaired. Install the removed EEPROM to the replaced board.



Procedure 3

When the data cannot be saved due to defective EEPROM, or when the EEPROM cannot be removed or installed, save the data from the same model of the same destination, and download it.



After the EVR data is saved and downloaded, check the respective items of the EVR data.
(Refer to page 6-3 or 6-5 for the items to be checked)

1-1. Adjusting items when replacing main parts and boards (Non MS model)

• Adjusting items when replacing main parts

When replacing main parts, adjust the items indicated by ● in the following table.

Note 1: When replacing the drum assy or the mechanism deck, reset the data of page: 7, address: A8 to AB to "00". (Refer to "Record of Use check" of "6-4. SERVICE MODE")

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E

Note 3: DCR-HC32/HC32E/HC33/HC33E model only.

Adjustment Section	Adjustment	Replaced part																		
		Block replacement							Mounted part replacement											
		Lens device	LCD block LCD901 (LCD panel, Touch panel)	LCD block D901 (Back light LED)	EVF block LCD902 (LCD panel)	Mechanism deck (Note 1)	Mechanism deck M901 (Drum assembly) (Note 1)	Mechanism deck MD block	CD-533 board IC101 (CCD imager)	LB-109 board D303 (Back light (EVF))	PD-237 board IC602 (LCD drive)	SI-042 board SE601, 602 (PITCH, YAW sensor)	VC-376 board IC3001, X3001 (Timing generator)	VC-376 board IC3002 (S/H, AGC, A/D converter)	VC-376 board IC6001 (DV signal process)				
Initialization of 8, A, C, D, E, F, 1C, 1F page data	Initialization of A, D page data																			
	Initialization of 8, C, 1C page data																			
	Initialization of E, F, 1F page data																			
Camera	36MHz origin oscillation adj.												●							
	HALL adj.	●																		
	Flange back adj.	●							●											
	Optical axis adj.	●							●											
	F No. standard data input	●							●											
	Mechanical shutter adj. (Note 3)	●																		
	Color reproduction adj.								●					●						
	Auto white balance standard data input								●					●						
	LV standard data input								●					●						
	Auto white balance adj.								●					●						
	MAX GAIN adj.								●					●						
	Steadyshot check											●								
EVF	EVF automatic adj.				●					●					●					
LCD	LCD automatic adj.										●				●					
	V-COM adj.		●								●									
	Transmissive mode white balance adj.		●	●							●									
Mechanism	Tape path adj.					●	●	●												
System control	Touch panel adj.		●																	
	Node uniqe ID No. input																			
Servo, RF	CAP FG duty adj.					●		●												
	Switching position adj.					●	●	●												
	Error rate check					●	●	●							●					
Video	S VIDEO OUT Y level adj.														●					
	S VIDEO OUT chroma level adj.														●					

Table 6-1-1 (1)

• **Adjusting items when replacing a board or EEPROM**

When replacing a board or EEPROM, adjust the items indicated by ● in the following table.

Adjustment Section	Adjustment	Replaced part: CD-533 board (COMPLETE)	LB-109 board (COMPLETE)	PD-237 board (COMPLETE)	SI-042 board (COMPLETE)	VC-376 board (COMPLETE)	VC-376 board IC8602 (EEP ROM)	Supporting RadarW
Initialization of 8, A, C, D, E, F, 1C, 1F page data	Initialization of A, D page data					●	●	
	Initialization of 8, C, 1C page data					●	●	
	Initialization of E, F, 1F page data					●	●	
Camera	36MHz origin oscillation adj.					●	●	
	HALL adj.					●	●	●
	Flange back adj.	●				●	●	●
	Optical axis adj.	●				●	●	
	F No.standard data input	●				●	●	●
	Mechanical shutter adj. (Note 3)					●	●	●
	Color reproduction adj.	●				●	●	
	Auto white balance standard data input	●				●	●	●
	LV standard data input	●				●	●	●
	Auto white balance adj.	●				●	●	●
	MAX GAIN adj.	●				●	●	●
	Steadyshot check				●	●	●	●
EVF	EVF automatic adj.					●	●	●
LCD	LCD automatic adj.			●		●	●	●
	V-COM adj.			●		●	●	
	Transmissive mode white balance adj.			●		●	●	
Mechanism	Tape path adj.							
System control	Touch panel adj.					●	●	
	Node uniqe ID No. input					●	●	
Servo, RF	CAP FG duty adj.					●	●	●
	Switching position adj.					●	●	●
	Error rate check					●	●	●
Video	S VIDEO OUT Y level adj.					●	●	
	S VIDEO OUT chroma level adj.					●	●	

Table 6-1-1 (2)

1-2. Adjusting items when replacing main parts and boards (MS model)

• Adjusting items when replacing main parts

When replacing main parts, adjust the items indicated by ● in the following table.

Note 1: When replacing the drum assy or the mechanism deck, reset the data of page: 7, address: A8 to AB to "00". (Refer to "Record of Use check" of "6-4. SERVICE MODE")

Note 2: MS model: DCR-HC32/HC32E/HC33/HC33E

Adjustment Section	Adjustment	Replaced part																				
		Block replacement							Mounted part replacement													
		Lens device	LCD block LCD901	(LCD panel, Touch panel)	LCD block D901	(Back light LED)	EVF block LCD902	(LCD panel)	Mechanism deck (Note 1)	Mechanism deck M901	(Drum assembly) (Note 1)	Mechanism deck MD block	CD-533 board IC101	(CCD imager)	LB-109 board D303	(Back light (EVF))	PD-237 board IC602	(LCD drive)	SI-042 board SE601, 602	(PITCH, YAW sensor)	VC-377 board IC3101, X3101	(Timing generator)	VC-377 board IC3102	(S/H, AGC, A/D converter)	VC-377 board IC4001	(Video/Audio DSP, D/A converter etc)	VC-377 board IC4201	(DV signal process)	VC-377 board IC4301	(REC/PB AMP)	VC-377 board IC4401	(Video IN/OUT)	VC-377 board IC5102	(HI/DS control)	VC-377 board IC7001	(EVF drive)
Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F page data	Initialization of A, B, D, 1A, 1B page data																																
	Initialization of 8, C, 18, 1C page data																																
	Initialization of E, F, 19, 1E, 1F page data																																
Camera	36MHz origin oscillation adj.																				●									●			
	HALL adj.	●																															
	Flange back adj.	●											●																				
	Optical axis adj.	●											●																				
	F No. standard data input	●											●																				
	Mechanical shutter adj.	●																															
	Color reproduction adj.												●										●										
	Auto white balance standard data input												●										●										
	LV standard data input												●										●										
	Auto white balance adj.												●										●										
	MAX GAIN adj.												●										●										
	Steadyshot check																		●														
EVF	EVF automatic adj.						●								●										●								
LCD	LCD automatic adj.																●								●								
	V-COM adj.		●														●																
	Transmissive mode white balance adj.		●		●												●																
Mechanism	Tape path adj.								●		●																						
System control	Touch panel adj.		●																														
	Node uniqe ID No. input																																
Servo, RF	CAP FG duty adj.								●			●																					
	Switching position adj.								●	●		●																					
	Error rate check								●	●		●															●	●					
Video	S VIDEO OUT Y level adj.																								●					●			
	S VIDEO OUT chroma level adj.																								●					●			

Table 6-1-2 (1)

• Adjusting items when replacing a board or EEPROM

When replacing a board or EEPROM, adjust the items indicated by ● in the following table.

Adjustment Section	Adjustment	Replaced part: CD-533 board (COMPLETE)	LB-109 board (COMPLETE)	PD-237 board (COMPLETE)	SI-042 board (COMPLETE)	VC-377 board (COMPLETE)	VC-377 board IC5302 (EEP ROM)	VC-377 board IC5101 (EEP ROM)	Supporting RadarW
Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F page data	Initialization of A, B, D, 1A, 1B page data					●		●	
	Initialization of 8, C, 18, 1C page data					●	●		
	Initialization of E, F, 19, 1E, 1F page data					●	●		
Camera	36MHz origin oscillation adj.					●	●		
	HALL adj.					●	●		●
	Flange back adj.	●				●	●		●
	Optical axis adj.	●				●	●		
	F No.standard data input	●				●	●		●
	Mechanical shutter adj.					●	●		●
	Color reproduction adj.	●				●	●		●
	Auto white balance standard data input	●				●	●		●
	LV standard data input	●				●	●		●
	Auto white balance adj.	●				●	●		●
	MAX GAIN adj.	●				●	●		●
	Steadyshot check				●	●	●		●
EVF	EVF automatic adj.		●			●	●		●
LCD	LCD automatic adj.			●		●	●		●
	V-COM adj.			●		●	●		
	Transmissive mode white balance adj.			●		●	●		
Mechanism	Tape path adj.								
System control	Touch panel adj.					●		●	
	Node uniqe ID No. input					●	●		
Servo, RF	CAP FG duty adj.					●	●		●
	Switching position adj.					●	●		●
	Error rate check					●	●		●
Video	S VIDEO OUT Y level adj.					●	●		
	S VIDEO OUT chroma level adj.					●	●		

Table 6-1-2 (2)

Note 3: IC5202 (Flash memory) on the VC-377 board cannot be replaced.

6-1. CAMERA SECTION ADJUSTMENTS

1-1. PREPARATIONS BEFORE ADJUSTMENTS (CAMERA SECTION)

1-1-1. List of Service Tools

- Oscilloscope
- Color monitor
- Vectorscope
- AC power adapter
- Frequency counter

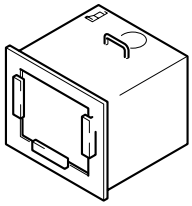
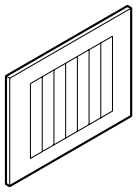
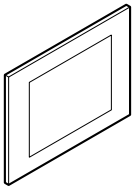
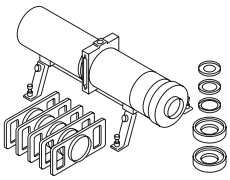
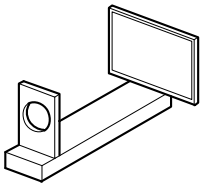
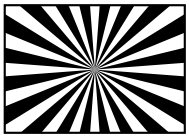
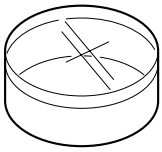
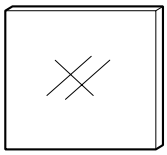
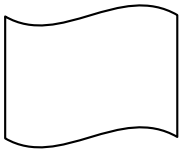
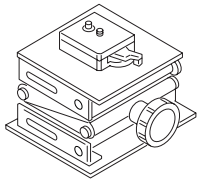
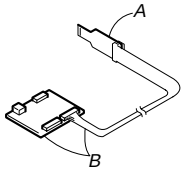
J-1 Adjustment remote commander J-6082-053-B	J-2  Pattern box PTB-450 J-6082-200-A or Small pattern box PTB-1450 J-6082-557-A	J-3  Color bar chart For PTB-450: J-6020-250-A For PTB-1450: J-6082-559-A
J-4  Clear chart For PTB-450: J-6080-621-A For PTB-1450: J-6082-560-A	J-5  Minipattern box J-6082-353-B	J-6  Flange back adjustment jig J-6082-563-A
J-7  Siemens star chart J-6080-875-A	J-8  Filter for color temperature correction (C14) J-6080-058-A	J-9  ND filter 1.0 J-6080-808-A ND filter 0.4 J-6080-806-A ND filter 0.1 J-6080-807-A
J-10  Back ground paper J-2501-130-A	J-11  Camera table J-6082-384-A	J-12  A: CPC-15 J-6082-564-A B: I/F unit for LANC control J-6082-521-A

Fig. 6-1-1

1-1-2. Preparations

Note: Before perform the adjustment, check that the data of page: 0, address: 10 is “00”.
If not, select page: 0, address: 10, and set data “00”.

1) Connect the equipment for adjustments according to Fig. 6-1-3.

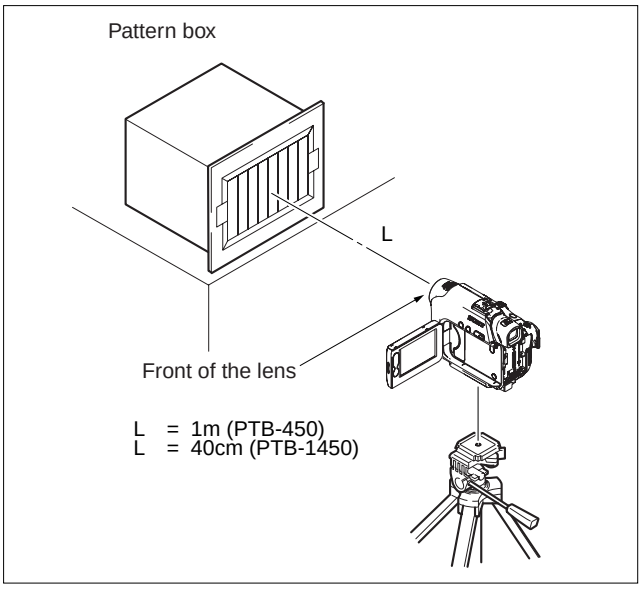


Fig. 6-1-2

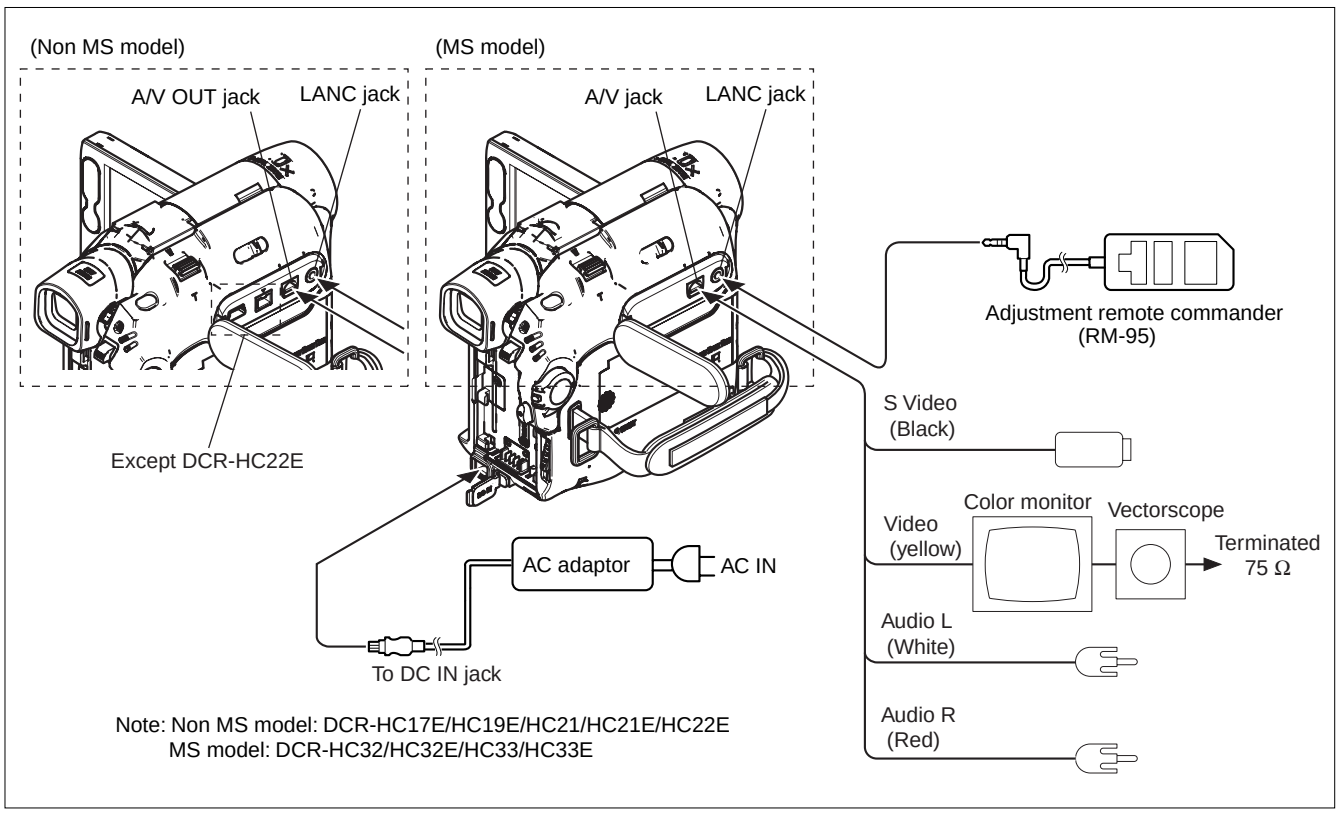


Fig. 6-1-3

1-1-3. Precaution

1. Setting the Switch

Unless otherwise specified, set the switches as follows and perform adjustments without loading cassette.

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

(Non MS model)

1. POWER switch (SS10300 block) ..... CAMERA
2. LENS COVER switch (Lens block) ..... OPEN
3. NIGHTSHOT PLUS switch (Lens block) ..... OFF
4. BACK LIGHT (FP-187 flexible) ..... OFF
5. PROGRAM AE (MENU setting) ..... AUTO
6. EXPOSURE (MENU setting) ..... AUTO
7. WHITE BAL (MENU setting) ..... AUTO
8. FOCUS (MENU setting) ..... MANUAL
9. D ZOOM (MENU setting) ..... OFF
10. WIDE SEL (MENU setting) 4:3
11. STEADY SHOT (MENU setting) ..... OFF
12. P EFFECT (MENU setting) ..... OFF
13. DEMO MODE (MENU setting) ..... OFF

(MS model)

1. POWER switch (SS10300 block) ..... CAMERA-TAPE
2. LENS COVER switch (Lens block) ..... OPEN
3. NIGHTSHOT PLUS switch (Lens block) ..... OFF
4. BACK LIGHT (FP-187 flexible) ..... OFF
5. PROGRAM AE (MENU setting) ..... AUTO
6. EXPOSURE (MENU setting) ..... AUTO
7. WHITE BAL. (MENU setting) ..... AUTO
8. FOCUS (MENU setting) ..... MANUAL
9. COLOR SLOW S (MENU setting) ..... OFF
10. DIGITAL ZOOM (MENU setting) ..... OFF
11. WIDE SELECT (MENU setting) 4:3
12. STEADY SHOT (MENU setting) ..... OFF
13. D EFFECT (MENU setting) ..... OFF
14. PICT EFFECT (MENU setting) ..... OFF
15. DEMO MODE (MENU setting) ..... OFF

2. Order of Adjustments

Basically carry out adjustments in the order given.

Color bar chart (Color reproduction adjustment frame)

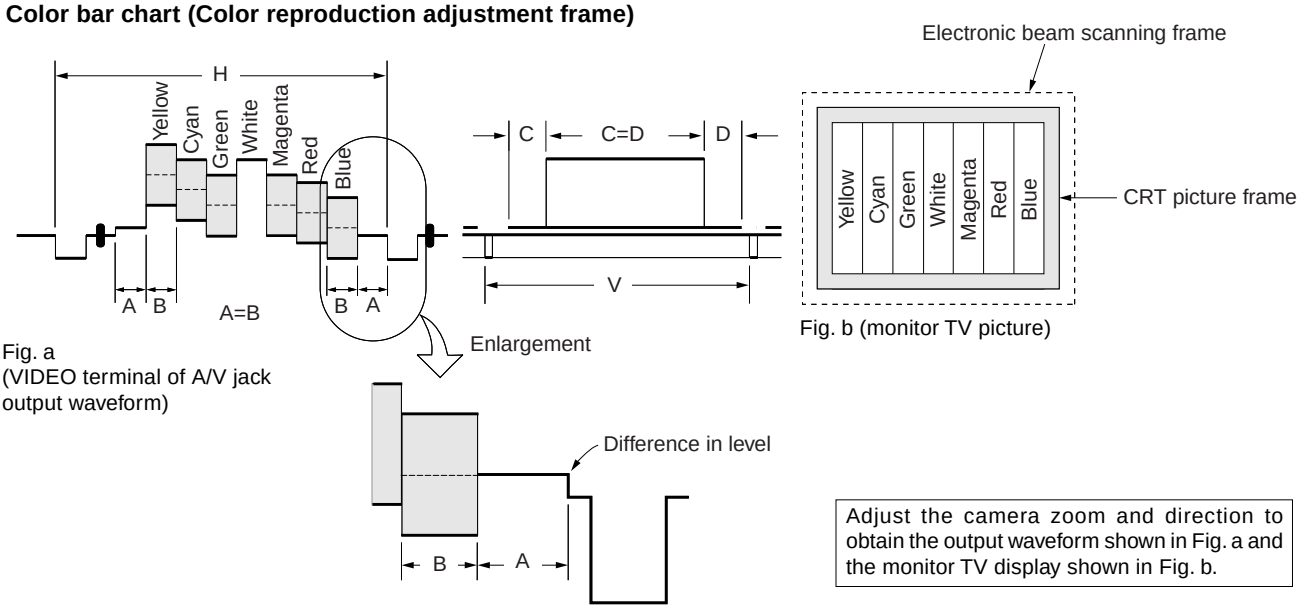


Fig. 6-1-4

3. Subjects

1) Color bar chart (Color reproduction adjustment frame)
   When performing adjustments using the color bar chart, adjust the picture frame as shown in Fig. 6-1-4. (Color reproduction adjustment frame)
2) Mixed color compensation chart (Color reproduction adjustment frame)
   Remove the color bar chart from the pattern box and insert a mixed color compensation chart in its place. (Do not perform zoom operations during this time)
3) Chart for flange back adjustment
   Join together a piece of white A0 size paper (1189mm × 841 mm) and a piece of black paper to make the chart shown in Fig. 6-1-5.

Note: Use a non-reflecting and non-glazing vellum paper. The size must be A0 or larger and the joint between the white and black paper must not have any undulations.

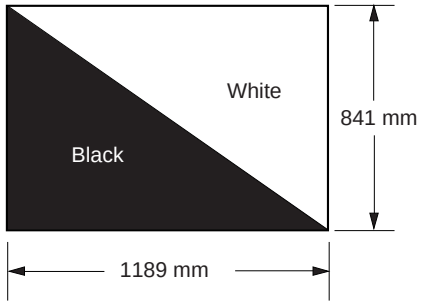


Fig. 6-1-5

4. Preparing the Flash Adjustment Box

A dark room is required to provide an accurate flash adjustment. If it is not available, prepare the flash adjustment box as given below;

1) Provide woody board A, B and C of 15 mm thickness.

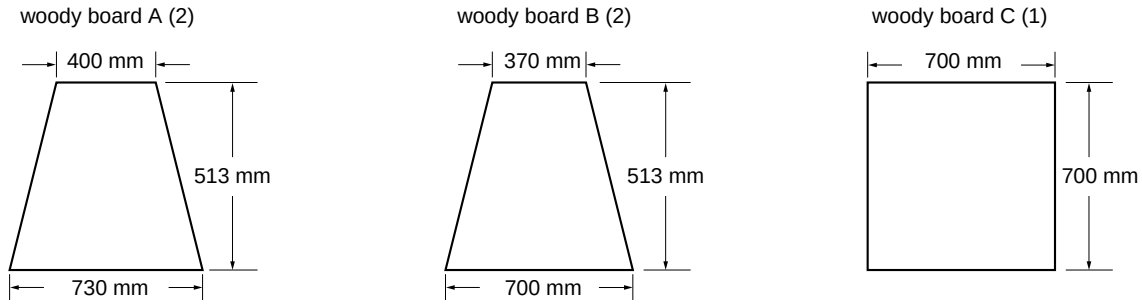


Fig. 6-1-6

2) Apply black mat paint to one side of woody board A and B.
3) Attach background paper (J-2501-130-A) to woody board C.
4) Assemble so that the black sides and the background paper side of woody board A, B and C are internal. (Fig. 6-1-7)

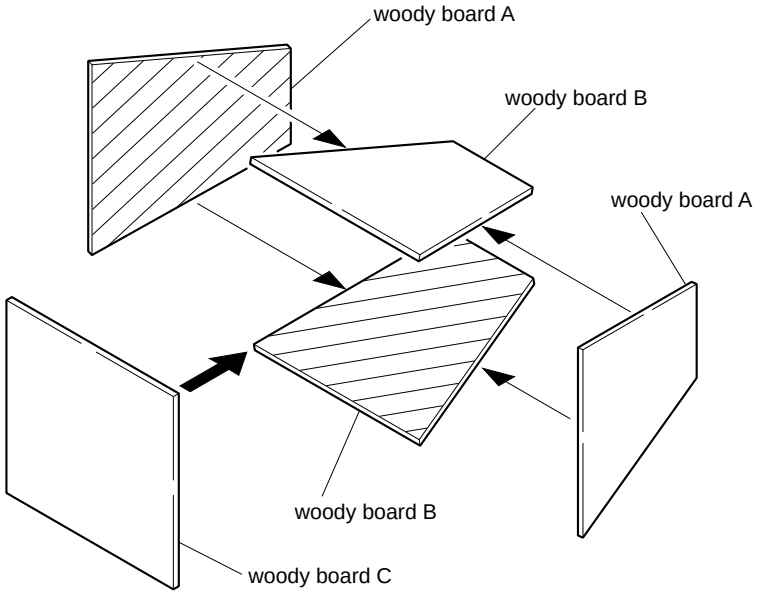


Fig. 6-1-7

1-2. INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA (Non MS model)

Note 1: If reading/writing data on pages 1C, 1F, set data: 01 to page: 0, address: 10, and then select pages C, F. By this data setting, the pages 1C, 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E

1-2-1. Initialization of A, D Page Data

Note: Check that the data of page: 0, address: 10 is "00".

1. Initializing of A, D Page Data

Note 1: If "Initialization of Pages A, D" is executed, all data on pages A, D are initialized.

Note 2: If the A, D page data has been initialized, the following adjustments need to be performed again.
1) Modification of A, D page data
2) Touch panel adjustment

Note 3: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Adjustment Page	A
Adjustment Address	10 to FF
Adjustment Page	D
Adjustment Address	10 to 7F

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	7	03		Set the following data. 01: NTSC model 81: PAL model
4	7	00		Set the following data. 20: Initializing A page 22: Initializing D page 28: Initializing A and D pages
5	7	01		Set the following data, and press PAUSE button. 20: Initializing A page 22: Initializing D page 28: Initializing A and D pages
6	7	02		Check the data changes to "01".
7				Perform "Modification of A, D Page Data"

2. Modification of A, D Page Data

If the A, D page data has been initialized, change the data of the"Fixed data-2" address shown in the following table by manual input.

Modifying method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note 1: If copy the data built in the different model, the camcorder may not operate.
3) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
4) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after completing modification A, D page data:

Order	Page	Address	Data	Procedure
1	2	00	29	
2	2	01	29	Press PAUSE button.

Note 2: If the following symptoms occur after completing of the"Modification A, D page data", check that the data of the "Fixed data-2" addresses of A, D page are same as those of the same model of the same destination.
1) The power is shut off so that unit cannot operate.

3. A Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, D Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, D Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10 to 19			Fixed data-1 (Initialized data)
1A			Fixed data-2
1B			
1C to 30			Fixed data-1 (Initialized data)
31			Fixed data-2
32			
33 to 38			Fixed data-1 (Initialized data)
39			Fixed data-2
3A to 43			Fixed data-1 (Initialized data)
44			Fixed data-2
45 to 4A			Fixed data-1 (Initialized data)
4B			Fixed data-2
4C			Fixed data-1 (Initialized data)
4D			Fixed data-2
4E			Fixed data-1 (Initialized data)
4F			Fixed data-2
50 to 52			Fixed data-1 (Initialized data)
53			Fixed data-2
54			
55			
56 to 79			Fixed data-1 (Initialized data)
7A			Fixed data-2
7B			
7C to 7F			Fixed data-1 (Initialized data)
80			Fixed data-2
81			
82	CB	CC	Touch panel adj
83	20	1D	
84	CF	C4	
85	1C	28	
86 to 8F			Fixed data-1 (Initialized data)
90			Fixed data-2
91 to F0			Fixed data-1 (Initialized data)
F1			Fixed data-2
F2			
F3			
F4 to FF			Fixed data-1 (Initialized data)

4. D Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, D Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, D Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	00	00	Test mode
11			Fixed data-1 (Initialized data)
12			Fixed data-2
13			
14 to 16			Fixed data-1 (Initialized data)
17			Fixed data-2
18			
19			
1A to 21			Fixed data-1 (Initialized data)
22			Fixed data-2
23			
24			
25			
26			
27 to 29			Fixed data-1 (Initialized data)
2A			Fixed data-2
2B			
2C to 36			Fixed data-1 (Initialized data)
37			Fixed data-2
38, 39			Fixed data-1 (Initialized data)
3A			Fixed data-2
3B, 3C			Fixed data-1 (Initialized data)
3D			Fixed data-2
3E, 3F			Fixed data-1 (Initialized data)
40			Fixed data-2
41 to 54			Fixed data-1 (Initialized data)
55			Fixed data-2
56			
57			
58 to 6E			Fixed data-1 (Initialized data)
6F			Fixed data-2
70 to 7F			Fixed data-1 (Initialized data)

1-2-2. Initialization of 8, C, 1C Page Data

Note: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

1. Initializing of 8, C, 1C Page Data

Note 1: If "Initialization of Pages 8, C, 1C" is executed, all data on pages 8, C, 1C are initialized. (Only an individual page cannot be initialized)

Note 2: If the 8, C, 1C page data has been initialized, the following adjustments need to be performed again.
1) Modification of 8, C, 1C page data
2) Electronic viewfinder system adjustments
3) LCD system adjustments
4) Node unique ID No. input
5) Servo, RF system adjustments
6) Video system adjustments.

Adjustment Page	8
Adjustment Address	00 to FF
Adjustment Page	C
Adjustment Address	10 to FF
Adjustment Page	1C
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	3	81		Check that the data is "00".
4	3	80	0C	Press PAUSE button.
5	3	80		Check the data changes to "1C".
6				Perform "Modification of 8, C, 1C Page Data"

2. Modification of 8, C, 1C Page Data

If the 8, C, 1C page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages 8, C, set data: 00 to page: 0, address: 10, and then select pages 8, C.
3) If modification of data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages C. After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after completing modification 8, C, 1C page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.

3. 8 Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 3F	Fixed data-1 (Initialized data)		
40	Fixed data-2		
41 to 4C	Fixed data-1 (Initialized data)		
4D	Fixed data-2		
4E to 79	Fixed data-1 (Initialized data)		
7A	Fixed data-2		
7B			
7C to 89	Fixed data-1 (Initialized data)		
8A	Fixed data-2		
8B to 8D	Fixed data-1 (Initialized data)		
8E	Fixed data-2		
8F			
90 to B2	Fixed data-1 (Initialized data)		
B3	Fixed data-2		
B4 to BE	Fixed data-1 (Initialized data)		
BF	Fixed data-2		
C0 to C3	Fixed data-1 (Initialized data)		
C4	Fixed data-2		
C5			
C6			
C7			
C8			
C9	Fixed data-1 (Initialized data)		
CA	Fixed data-2		
CB			
CC to D5	Fixed data-1 (Initialized data)		
D6	Fixed data-2		
D7			
D8 to FF	Fixed data-1 (Initialized data)		

4. C Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	EE	EE	Switching position adj.
11	00	00	
12	00	00	
13	00	00	
14, 15	Fixed data-1 (Initialized data)		
16	E0	E0	CAP FG duty adj.
17 to 24	Fixed data-1 (Initialized data)		
25	80	80	S VIDEO OUT Y level adj.
26	90	90	S VIDEO OUT chroma level adj.
27	65	65	
28 to 3B	Fixed data-1 (Initialized data)		
3C	Fixed data-2		
3D, 3E	Fixed data-1 (Initialized data)		
3F	6C	6C	EVF automatic adj. (VCO adj.)
40	90	90	
41 to 44	Fixed data-1 (Initialized data)		
45	Fixed data-2		
46			
47	28	28	EVF automatic adj. (Contrast adj.)
48 to 4C	Fixed data-1 (Initialized data)		
4D	Fixed data-2		
4E			
4F			
50	6C	6C	LCD automatic adj. (VCO adj.)
51	90	90	
52	BC	BC	V-COM adj. (LCD)
53, 54	Fixed data-1 (Initialized data)		
55	Fixed data-2		
56	7D	7D	Transmissive mode white balans adj. (LCD)
57	73	73	
58	52	52	LCD automatic adj. (Contrast adj.)
59 to 5E	Fixed data-1 (Initialized data)		
5F	Fixed data-2		
60 to 65	Fixed data-1 (Initialized data)		
66	Fixed data-2		
67			
68			
69 to 74	Fixed data-1 (Initialized data)		
75	Fixed data-2		
76 to A8	Fixed data-1 (Initialized data)		
A9	Fixed data-2		

C Page Table

Address	Initial value		Remark
	NTSC	PAL	
AA			Fixed data-1 (Initialized data)
AB			Fixed data-2
AC			
AD to AF			Fixed data-1 (Initialized data)
B0			Fixed data-2
B1			
B2			
B3			Fixed data-1 (Initialized data)
B4			Fixed data-2
B5			
B6 to D1			Fixed data-1 (Initialized data)
D2			Fixed data-2
D3			
D4			
D5 to DD			Fixed data-1 (Initialized data)
DE			Fixed data-2
DF			
E0 to E4			Fixed data-1 (Initialized data)
E5	00	00	Node unique ID No. Input
E6	00	00	
E7	00	00	
E8 to F3			Fixed data-1 (Initialized data)
F4	00	00	Emergency memory address (Mechanism section)
F5	00	00	
F6	00	00	
F7	00	00	
F8	00	00	
F9	00	00	
FA	00	00	
FB	00	00	
FC	00	00	
FD	00	00	
FE	00	00	
FF	00	00	

5. 1C Page Table

Note 1: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to B2			Fixed data-1 (Initialized data)
B3	00	00	SD error rate check (LP)
B4	00	00	
B5	00	00	
B6	00	00	
B7	00	00	
B8	80	80	
B9	00	00	
BA	00	00	
BC	00	00	
BD	00	00	
BE	00	00	
BF	00	00	
C0	00	00	
C1	00	00	
C2	00	00	
C3	80	80	
C4	00	00	
C5	00	00	
C6	00	00	
C7	00	00	
C8	00	00	
C9 to E5			Fixed data-1 (Initialized data)
E6			Fixed data-2
E7 to E9			Fixed data-1 (Initialized data)
EA			Fixed data-2
EB			
EC to EE			Fixed data-1 (Initialized data)
EF			Fixed data-2
F0			
F1 to FF			Fixed data-1 (Initialized data)

1-2-3. Initialization of E, F, 1F Page Data

Note: Check that the data of page: 0, address: 10 is "00".

1. Initializing of E, F, 1F Page Data

Note 1: If "Initialization of Pages E, F, 1F" is executed, all data on pages E, F, 1F are initialized. (Only an individual page cannot be initialized)

Note 2: If the E, F, 1F page data has been initialized, the following adjustments need to be performed again.
1) Modification of E, F, 1F page data
2) Camera system adjustments

Note 3: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Adjustment Page	E
Adjustment Address	00 to FF
Adjustment Page	F
Adjustment Address	10 to FF
Adjustment Page	1F
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	6	01		Set the following data, and press PAUSE button. 2D: NTSC model 2F: PAL model
4	6	03	FF	Press PAUSE button.
5	6	02		Check the data changes to "01".
6	6	01	00	Press PAUSE button.
7				Perform "Modification of E, F, 1F Page Data"

2. Modification of E, F, 1F Page Data

If the E, F, 1F page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages E, F, set data: 00 to page: 0, address: 10, and then select pages E, F.
3) If modification of data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages F. After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after completing modification E, F, 1F page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.
4				Perform "36MHz Origin Oscillation Adjustment" of CAMERA SYSTEM ADJUSTMENTS.

3. E Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the E, F, 1F Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of E, F, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 11			Fixed data-1 (Initialized data)
12			Fixed data-2
13, 14			Fixed data-1 (Initialized data)
15			Fixed data-2
16			
17			
18 to 34			Fixed data-1 (Initialized data)
35			Fixed data-2
36 to 41			Fixed data-1 (Initialized data)
42			Fixed data-2
43			
44			
45			
46			
47			
48			
49			
4A			
4B			Fixed data-1 (Initialized data)
4C			Fixed data-2
4D to 55			Fixed data-1 (Initialized data)
56			Fixed data-2
57			
58 to 68			Fixed data-1 (Initialized data)
69			Fixed data-2
6A to 8D			Fixed data-1 (Initialized data)
8E			Fixed data-2
8F			
90			Fixed data-1 (Initialized data)
91			Fixed data-2
92 to A3			Fixed data-1 (Initialized data)
A4			Fixed data-2
A5 to BD			Fixed data-1 (Initialized data)
BE			Fixed data-2
BF to DA			Fixed data-1 (Initialized data)
DB			Fixed data-2
DC to E4			Fixed data-1 (Initialized data)
E5			Fixed data-2
E6 to FF			Fixed data-1 (Initialized data)

4. F Page Table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the E, F, 1F Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of E, F, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	80	80	36MHz origin osillation adj.
11			Fixed data-1 (Initialized data)
12	50	50	Hall adj.
13	50	50	
14	89	89	
15	00	00	
16	17	17	
17	00	00	
18	00	00	
19	A8	A8	MAX GAIN adj.
1A	36	36	LV standard data input
1B	00	00	
1C	00	00	F No. standard data input
1D	00	00	
1E	00	00	
1F	00	00	
20	00	00	
21	00	00	
22	00	00	
23	00	00	
24 to 29			Fixed data-1 (Initialized data)
2A	27	27	Auto white balance standard data input
2B	00	00	
2C	08	08	
2D	00	00	
2E	18	18	Auto white balance adj.
2F	00	00	
30	0E	0E	
31	00	00	
32			Fixed data-1 (Initialized data)
33	48	47	Color reproduction adj.
34			Fixed data-1 (Initialized data)
35	2A	2B	Color reproduction adj.
36 to 39			Fixed data-1 (Initialized data)
3A	00	FF	Color reproduction adj.
3B	EF	ED	
3C, 3D			Fixed data-1 (Initialized data)
3E	2A	2A	Auto white balance adj.
3F	00	C0	
40	5D	5C	
41	00	00	
42, 43			Fixed data-1 (Initialized data)

F Page Table

Address	Initial value		Remark
	NTSC	PAL	
44	3A	3A	Flange back adj.
45	74	74	
46	3F	3F	
47	2C	2C	
48	17	17	
49	4A	4A	
4A	00	00	
4B	00	00	
4C	00	00	
4D	00	00	
4E	4F	4F	
4F	19	19	
50	00	00	
51	30	30	
52	04	04	
53	00	00	
54	00	00	
55 to 57			Fixed data-1 (Initialized data)
58			Fixed data-2
59			
5A	FF	FF	Optical axis adj.
5B to 67			Fixed data-1 (Initialized data)
68	00	00	Mechanical shutter adj.
69	00	00	
6A	00	00	
6B	00	00	
6C	00	00	
6D	00	00	
6E	00	00	
6F	00	00	
70	00	00	
71	00	00	
72	00	00	
73	00	00	
74	00	00	
75	00	00	
76	00	00	
77	00	00	
78	00	00	
79	00	00	
7A	00	00	
7B	00	00	
7C	00	00	
7D	00	00	

Address	Initial value		Remark
	NTSC	PAL	
7E to 8B			Fixed data-1 (Initialized data)
8C			Fixed data-2
8D			
8E			
8F			
90			
91, 92			Fixed data-1 (Initialized data)
93			Fixed data-2
94			
95			
96			
97, 98			Fixed data-1 (Initialized data)
99			Fixed data-2
9A to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD			
AE			
AF			
B0			
B1 to EA			Fixed data-1 (Initialized data)
EB			Fixed data-2
EC, ED			Fixed data-1 (Initialized data)
EE			Fixed data-2
EF to FA			Fixed data-1 (Initialized data)
FB			Fixed data-2
FC to FF			Fixed data-1 (Initialized data)

5. 1F Page Table

Note 1: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the E, F, 1F Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of E, F, 1F Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to 07			Fixed data-1 (Initialized data)
08			Fixed data-2
09 to 59			Fixed data-1 (Initialized data)
5A	00	00	Emergency memory address (Camera section)
5B	00	00	
5C	00	00	
5D	00	00	
5E to FF			Fixed data-1 (Initialized data)

1-3. INITIALIZATION OF 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F PAGE DATA (MS model)

Note 1: If reading/writing data on pages 18, 19, 1A, 1B, 1C, 1E, 1F, set data: 01 to page: 0, address: 10, and then select pages: 8, 9, A, B, C, E, F.
By this data setting, the pages 18, 19, 1A, 1B, 1C, 1E, 1F, can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: MS model: DCR-HC32/HC32E/HC33/HC33E

1-3-1. Initialization of A, B, D, 1A, 1B Page Data

Note: Check that the data of page: 0, address: 10 is "00".

1. Initializing of A, B, D, 1A, 1B Page Data

Note 1: If the A, B, D, 1A, 1B page data has been initialized, the following adjustments need to be performed again.
1) Modification of A, B, D, 1A, 1B page data
2) Touch panel adjustment

Note 2: NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Adjustment Page	A
Adjustment Address	10 to FF
Adjustment Page	B
Adjustment Address	00 to FF
Adjustment Page	D
Adjustment Address	10 to 70
Adjustment Page	1A
Adjustment Address	00 to FF
Adjustment Page	1B
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	7	04		Set the following data 20: NTSC model 21: PAL model
4	7	01		Set the following data 20: Initializing A page 21: Initializing B page 22: Initializing D page 23: Initializing 1A page 24: Initializing 1B page 25: Initializing A and 1A page 26: Initializing B and 1B page 28: Initializing A, B, D, 1A and 1B page
5	7	00	01	Press PAUSE button.
6	7	02		Check the data changes to "01".
7				Perform "Modification of A, B, D, 1A, 1B Page Data"

2. Modification of A, B, D, 1A, 1B Page Data

If the A, B, D, 1A, 1B page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages A, B, D, set data: 00 to page: 0, address: 10, and then select pages A, B, D.
3) If modification of data on pages 1A, 1B, set data: 01 to page: 0, address: 10, and then select pages A, B.
After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
Note 1: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after Completing Modification A, B, D, 1A, 1B page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.

Note 2: If following symptoms occur after completing of the "Modification A, B, D, 1A, 1B page data", check that the data of the "Fixed data-2" address of A, B, D, 1A, 1B page are same as those of same model of same destination.
1) The power is shut off so that unit cannot operate.

3. A Page table

Note 1: Check that the data of page: 0, address: 10 is“00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the A, B, D, 1A, 1B Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of A, B, D, 1A, 1B Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	00	00	Test mode
11 to 17			Fixed data-1 (Initialized data)
18			Fixed data-2
19 to 2E			Fixed data-1 (Initialized data)
2F			Fixed data-2
30			Fixed data-1 (Initialized data)
31			Fixed data-2
32 to 60			Fixed data-1 (Initialized data)
61			Fixed data-2
62			
63			
64 to 8F			Fixed data-1 (Initialized data)
90	E0	DD	Touch panel adj
91	1D	1C	
92	D4	C7	
93	24	2A	
94 to CF			Fixed data-1 (Initialized data)
D0			Fixed data-2
D1			
D2			
D3, D4			Fixed data-1 (Initialized data)
D5			Fixed data-2
D6			Fixed data-1 (Initialized data)
D7			Fixed data-2
D8			Fixed data-1 (Initialized data)
D9			Fixed data-2
DA to F0			Fixed data-1 (Initialized data)
F1			Fixed data-2
F2			
F3			
F4 to FF			Fixed data-1 (Initialized data)

4. B Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, B, D, 1A, 1B Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, B, D, 1A, 1B Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to FF			Fixed data-1 (Initialized data)

5. D Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, B, D, 1A, 1B Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of A, B, D, 1A, 1B Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10 to 13			Fixed data-1 (Initialized data)
14			Fixed data-2
15			Fixed data-1 (Initialized data)
16			Fixed data-2
17			
18 to 27			Fixed data-1 (Initialized data)
28			Fixed data-2
29			
2A			
2B			
2C			
2D			Fixed data-1 (Initialized data)
2E			Fixed data-2
2F			
30			
31, 32			Fixed data-1 (Initialized data)
33			Fixed data-2
34 to 44			Fixed data-1 (Initialized data)
45			Fixed data-2
46, 47			Fixed data-1 (Initialized data)
48			Fixed data-2
49			Fixed data-1 (Initialized data)
4A			Fixed data-2
4B			
4C			Fixed data-1 (Initialized data)
4D			Fixed data-2
4E			
4F to 56			Fixed data-1 (Initialized data)
57			Fixed data-2
58 to 70			Fixed data-1 (Initialized data)

6. 1A Page table

Note 1: If reading/writing data on pages 1A, set data: 01 to page: 0, address: 10, and then select pages: A. By this data setting, the pages 1A can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the A, B, D, 1A, 1B Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of A, B, D, 1A, 1B Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to FF	Fixed data-1 (Initialized data)		

7. 1B Page table

Note 1: If reading/writing data on pages 1B, set data: 01 to page: 0, address: 10, and then select pages: B. By this data setting, the pages 1B can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the A, B, D, 1A, 1B Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of A, B, D, 1A, 1B Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to FF	Fixed data-1 (Initialized data)		

1-3-2. Initialization of 8, C, 18, 1C Page Data

1. Initializing of 8, C, 18, 1C Page Data

Note1: If "Initialization of Pages 8, C, 18, 1C" is executed, all data on pages 8, C, 18, 1C are initialized. (Only an individual page cannot be initialized)

Note2 : If the 8, C, 18, 1C page data has been initialized, the following adjustments need to be performed again.
1) Modification of 8, C, 18, 1C page data
2) Electronic viewfinder system adjustments (if all areas were initialized)
3) LCD system adjustments (if all areas were initialized)
4) Node unique ID No. input (if all areas were initialized)
5) Servo, RF system adjustments (if all areas were initialized)
6) Video system adjustments (if all areas were initialized)

Adjustment Page	8
Adjustment Address	00 to FF
Adjustment Page	C
Adjustment Address	10 to FF
Adjustment Page	18
Adjustment Address	00 to FF
Adjustment Page	1C
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	3	81		Check the data is "00".
4	3	80	0C	Press PAUSE button.
5	3	80		Check the data changes to "1C".
6				Perform "Modification of 8, C, 18, 1C Page Data"

Note 3: If other than adjustment address was initialized, the adjusted data is not initialized.

2. Modification of 8, C, 18, 1C Page Data

If the 8, C, 18, 1C page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages 8, C, set data: 00 to page: 0, address: 10, and then select pages 8, C.
3) If modification of data on pages 18, 1C, set data: 01 to page: 0, address: 10, and then select pages 8, C.
   After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) If all areas were initialized, check that the data at the addresses for adjustment are initial values (adjustment initial values) listed in the table.
   If different, change them to the adjustment initial values.

Processing after Completing Modification 8, C, 18, 1C page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.

3. 8 Page table

Note 1: Check that the data of page: 0, address: 10 is“00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 18, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 18, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 29			Fixed data-1 (Initialized data)
2A			Fixed data-2
2B to 3F			Fixed data-1 (Initialized data)
40			Fixed data-2
41 to 4C			Fixed data-1 (Initialized data)
4D			Fixed data-2
4E to 79			Fixed data-1 (Initialized data)
7A			Fixed data-2
7B			
7C to 83			Fixed data-1 (Initialized data)
84			Fixed data-2
85			
86			
87			
88			
89			
8A to 8D			Fixed data-1 (Initialized data)
8E			Fixed data-2
8F			
90 to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA, AB			Fixed data-1 (Initialized data)
AC			Fixed data-2
AD to B1			Fixed data-1 (Initialized data)
B2			Fixed data-2
B3			
B4			
B5			Fixed data-1 (Initialized data)
B6			Fixed data-2
B7			Fixed data-1 (Initialized data)
B8			Fixed data-2
B9			
BA			
BB			
BC, BD			Fixed data-1 (Initialized data)
BE			Fixed data-2
BF			
C0 to C2			Fixed data-1 (Initialized data)
C3			Fixed data-2
C4			
C5			
C6			Fixed data-1 (Initialized data)
C7			Fixed data-2
C8			
C9			
CA			
CB			
CC			
CD			
CE to D5			Fixed data-1 (Initialized data)
D6			Fixed data-2
D7			
D8 to DF			Fixed data-1 (Initialized data)
E0			Fixed data-2
E1			Fixed data-1 (Initialized data)
E2			Fixed data-2
E3			
E4			
E5			
E6			
E7			
E8 to EF			Fixed data-1 (Initialized data)
F0			Fixed data-2
F1 to F9			Fixed data-1 (Initialized data)
FA			Fixed data-2
FB			
FC to FF			Fixed data-1 (Initialized data)

4. C Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 18, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 18, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	EE	EE	Switching position adj.
11	00	00	
12	00	00	
13	00	00	
14, 15			Fixed data-1 (Initialized data)
16	E0	E0	CAP FG duty adj.
17 to 24			Fixed data-1 (Initialized data)
25	80	80	S VIDEO OUT Y level adj.
26	54	54	S VIDEO OUT chroma level adj.
27	3D	3D	
28 to 3B			Fixed data-1 (Initialized data)
3C			Fixed data-2
3D			
3E			
3F	A0	A0	EVF automatic adj. (VCO adj.)
40	B0	B0	
41			Fixed data-1 (Initialized data)
42			Fixed data-2
43			Fixed data-1 (Initialized data)
44			Fixed data-2
45			
46			
47	28	28	EVF automatic adj. (Contrast adj.)
48			Fixed data-2
49			
4A, 4B			Fixed data-1 (Initialized data)
4C			Fixed data-2
4D			
4E			
4F			
50	A0	A0	LCD automatic adj. (VCO adj.)
51	B0	B0	
52	BC	BC	V-COM adj. (LCD)
53, 54			Fixed data-1 (Initialized data)
55			Fixed data-2
56	88	88	Transmissive mode white balans adj. (LCD)
57	71	71	
58	50	50	LCD automatic adj. (Contrast adj.)
59			Fixed data-2
5A to 5E			Fixed data-1 (Initialized data)
5F			Fixed data-2

Address	Initial value		Remark
	NTSC	PAL	
60, 61			Fixed data-1 (Initialized data)
62			Fixed data-2
63			
64, 65			Fixed data-1 (Initialized data)
66			Fixed data-2
67			
68			
69, 6A			Fixed data-1 (Initialized data)
6B			Fixed data-2
6C to 74			Fixed data-1 (Initialized data)
75			Fixed data-2
76 to 78			Fixed data-1 (Initialized data)
79			Fixed data-2
7A			
7B			
7C			
7D			Fixed data-1 (Initialized data)
7E			Fixed data-2
7F to A0			Fixed data-1 (Initialized data)
A1			Fixed data-2
A2			
A3			
A4			
A5 to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD to B1			Fixed data-1 (Initialized data)
B2			Fixed data-2
B3			
B4			
B5			
B6 to CB			Fixed data-1 (Initialized data)
CC			Fixed data-2
CD			
CE			
CF			
D0			
D1			
D2			
D3			
D4			
D5 to DD			Fixed data-1 (Initialized data)
DE			Fixed data-2
DF			

C Page table

Address	Initial value		Remark
	NTSC	PAL	
E0 to E4			Fixed data-1 (Initialized data)
E5	00	00	Node unique ID No. Inputs
E6	00	00	
E7	00	00	
E8 to F3			Fixed data-1 (Initialized data)
F4	00	00	Emergency memory address (Mechanism section)
F5	00	00	
F6	00	00	
F7	00	00	
F8	00	00	
F9	00	00	
FA	00	00	
FB	00	00	
FC	00	00	
FD	00	00	
FE	00	00	
FF	00	00	

5. 18 Page table

Note 1: If reading/writing data on pages 18, set data: 01 to page: 0, address: 10, and then select pages: 8. By this data setting, the pages 18 can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to“00”.

Note 2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 18, 1C Page Data”)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 18, 1C Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00			Fixed data-1 (Initialized data)
01			Fixed data-2
02 to FF			Fixed data-1 (Initialized data)

6. 1C Page table

Note 1: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages: C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to"00".

Note 2: Fixed data-1: Initialized data. (Refer to "1. Initializing the 8, C, 18, 1C Page Data")
Fixed data-2: Modified data. (Refer to "2. Modification of 8, C, 18, 1C Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to B2			Fixed data-1 (Initialized data)
B3	00	00	SD error rate check (LP)
B4	00	00	
B5	00	00	
B6	00	00	
B7	00	00	
B8	80	80	
B9	00	00	
BA	00	00	
BB	00	00	
BC	00	00	
BD	00	00	
BE	00	00	
BF	00	00	
C0	00	00	
C1	00	00	
C2	00	00	
C3	80	80	
C4	00	00	
C5	00	00	
C6	00	00	
C7	00	00	
C8	00	00	
C9 to E5			Fixed data-1 (Initialized data)
E6			Fixed data-2
E7			Fixed data-1 (Initialized data)
E8	00	00	When IC5301 is Type A. (This data vary according to the type of the IC5301 of VC-37 board.) (Note 3)
	1E	1E	When IC5301 is Type B. (This data vary according to the type of the IC5301 of VC-377 board.) (Note 3)
E9			Fixed data-1 (Initialized data)
EA			Fixed data-2
EB			
EC to EE			Fixed data-1 (Initialized data)
EF			Fixed data-2
F0			
F1 to F7			Fixed data-1 (Initialized data)
F8	00	00	When IC5301 is Type A. (This data vary according to the type of the IC5301 of VC-377 board.) (Note 3)
	60	60	When IC5301 is Type B. (This data vary according to the type of the IC5301 of VC-377 board.) (Note 3)
F9 to FF			Fixed data-1 (Initialized data)

Note 3: By checking the data of page: 6, address: FF, the type of IC5301 of VC-377 board can be discriminated.

Order	Page	Address	Data	Procedure
1	0	10	00	
2	6	FF		Check the data. 01: Type A 02 or more: Type B

1-3-3. Initialization of E, F, 19, 1E, 1F Page Data

1. Initializing of E, F, 19, 1E, 1F Page Data

Note 1: If "Initialization of Pages E, F, 19, 1E, 1F" is executed, all data on pages E, F, 19, 1E, 1F are initialized. (Only an individual page cannot be initialized)

Note 2: If the E, F, 19, 1E, 1F page data has been initialized, the following adjustments need to be performed again.
1) Modification of E, F, 19, 1E, 1F page data
2) Camera system adjustment (if all areas were initialized)

Note 3: NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Adjustment Page	E
Adjustment Address	00 to FF
Adjustment Page	F
Adjustment Address	10 to FF
Adjustment Page	19
Adjustment Address	00 to 33
Adjustment Page	1E
Adjustment Address	00 to FF
Adjustment Page	1F
Adjustment Address	00 to FF

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	00	
3	6	01		Set the following data 2D: NTSC model 2F: PAL model
4	6	03	FF	Press PAUSE button.
5	6	02		Check the data changes to "01".
6	6	01	00	Press PAUSE button.
7				Perform "Modification of E, F, 19, 1E, 1F Page Data"

2. Modification of E, F, 19, 1E, 1F Page Data

If the E, F, 19, 1E, 1F page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) If modification of data on pages E, F, set data: 00 to page: 0, address: 10, and then select pages E, F.
3) If modification of data on pages 19, 1E, 1F, set data: 01 to page: 0, address: 10, and then select pages 9, E, F.
   After the modification of data finished, return the data on page: 0, address: 10 to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) If all areas were initialized, check that the data at the addresses for adjustment are initial values (adjustment initial values) listed in the table.
   If different, change them to the adjustment initial values.

Processing after Completing Modification E, F, 19, 1E, 1F page data:

Order	Page	Address	Data	Procedure
1	0	10	00	
2	2	00	29	
3	2	01	29	Press PAUSE button.
4				Perform "36MHz Origin Oscillation Adjustment" of CAMERA SYSTEM ADJUSTMENTS.

3. E Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 07			Fixed data-1 (Initialized data)
08			Fixed data-2
09			
0A to 11			Fixed data-1 (Initialized data)
12			Fixed data-2
13, 14			Fixed data-1 (Initialized data)
15			Fixed data-2
16			
17			
18 to 34			Fixed data-1 (Initialized data)
35			Fixed data-2
36 to 68			Fixed data-1 (Initialized data)
69			Fixed data-2
6A to 8D			Fixed data-1 (Initialized data)
8E			Fixed data-2
8F			
90			Fixed data-1 (Initialized data)
91			Fixed data-2
92 to A3			Fixed data-1 (Initialized data)
A4			Fixed data-2
A5 to AA			Fixed data-1 (Initialized data)
AB			Fixed data-2
AC to AF			Fixed data-1 (Initialized data)
B0			Fixed data-2
B1			Fixed data-1 (Initialized data)
B2			Fixed data-2
B3			
B4 to BD			Fixed data-1 (Initialized data)
BE			Fixed data-2
BF to E2			Fixed data-1 (Initialized data)
E3			Fixed data-2
E4			
E5			
E6 to FF			Fixed data-1 (Initialized data)

4. F Page table

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
10	80	80	36MHz origin osillation adj.
11			Fixed data-1 (Initialized data)
12	50	50	Hall adj.
13	50	50	
14	89	89	
15	00	00	
16	17	17	
17	00	00	
18	19	19	
19	9A	9A	MAX GAIN adj.
1A	36	36	LV standard data input
1B	00	00	
1C	00	00	F No. standard data input
1D	00	00	
1E	00	00	
1F	00	00	
20	00	00	
21	00	00	
22	00	00	
23	00	00	
24 to 29			Fixed data-1 (Initialized data)
2A	1B	1B	Auto white balance standard data input
2B	00	00	
2C	07	07	
2D	00	00	
2E	0E	0E	Auto white balance adj.
2F	00	00	
30	0D	0D	
31	00	00	
32			Fixed data-1 (Initialized data)
33	22	22	Color reproduction adj.
34			Fixed data-1 (Initialized data)
35	27	24	Color reproduction adj.
36 to 39			Fixed data-1 (Initialized data)
3A	00	00	Color reproduction adj.
3B	F1	EF	
3C, 3D			Fixed data-1 (Initialized data)
3E	2C	2C	Auto white balance adj.
3F	B0	B0	
40	5F	5F	
41	A0	A0	
42, 43			Fixed data-1 (Initialized data)

F Page table

Address	Initial value		Remark
	NTSC	PAL	
44	3A	3A	Flange back adj.
45	74	74	
46	3F	3F	
47	2C	2C	
48	17	17	
49	4A	4A	
4A	00	00	
4B	00	00	
4C	00	00	
4D	00	00	
4E	4F	4F	
4F	19	19	
50	00	00	
51	30	30	
52	04	04	
53	00	00	
54	00	00	
55	00	00	
56 to 63			Fixed data-1 (Initialized data)
64			Fixed data-2
65			
66	FF	FF	Optical axis adj.
67			Fixed data-1 (Initialized data)
68	80	80	Mechanical shutter adj.
69	80	80	
6A	80	80	
6B	80	80	
6C	80	80	
6D	80	80	
6E	40	40	
6F	00	00	
70	34	34	
71	00	00	
72	30	30	
73	00	00	
74	2A	2A	
75	00	00	
76	14	14	
77	00	00	
78	70	70	
79	80	80	
7A	80	80	
7B	80	80	
7C	80	80	
7D	1E	1E	

Address	Initial value		Remark
	NTSC	PAL	
7E to 8B			Fixed data-1 (Initialized data)
8C			Fixed data-2
8D			
8E			
8F			
90			
91, 92			Fixed data-1 (Initialized data)
93			Fixed data-2
94			
95			
96			
97			
98			Fixed data-1 (Initialized data)
99			Fixed data-2
9A to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD			
AE			
AF			
B0			
B1 to E4			Fixed data-1 (Initialized data)
E5			Fixed data-2
E6 to EA			Fixed data-1 (Initialized data)
EB			Fixed data-2
EC, ED			Fixed data-1 (Initialized data)
EE			Fixed data-2
EF			
F0			
F1			
F2			
F3			
F4			
F5			Fixed data-1 (Initialized data)
F6			Fixed data-2
F7			
F8			
F9			
FA			
FB			
FC			
FD			
FE			
FF			

5. 19 Page table

Note 1: If reading/writing data on pages 19, set data: 01 to page: 0, address: 10, and then select pages: 9. By this data setting, the pages 19 can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to 33	Fixed data-1 (Initialized data)		

6. 1E Page table

Note 1: If reading/writing data on pages 1E, set data: 01 to page: 0, address: 10, and then select pages: E. By this data setting, the pages 1E can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Note 2: Fixed data-1: Initialized data. (Refer to“1. Initializing the E, F, 19, 1E, 1F Page Data”)
Fixed data-2: Modified data. (Refer to“2. Modification of E, F, 19, 1E, 1F Page Data”)

Address	Initial value		Remark
	NTSC	PAL	
00 to FF	Fixed data-1 (Initialized data)		

7. 1F Page table

Note 1: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages: F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Note 2: Fixed data-1: Initialized data. ("Refer to 1. Initializing the E, F, 19, 1E, 1F Page Data")
Fixed data-2: Modified data. ("Refer to 2. Modification of E, F, 19, 1E, 1F Page Data")

Address	Initial value		Remark
	NTSC	PAL	
00 to 07			Fixed data-1 (Initialized data)
08			Fixed data-2
09 to 1B			Fixed data-1 (Initialized data)
1C	00	00	Emergency memory address (Camera section)
1D	00	00	
1E	00	00	
1F	00	00	
20 to 29			Fixed data-1 (Initialized data)
2A			Fixed data-2
2B			
2C			Fixed data-1 (Initialized data)
2D			Fixed data-2
2E			
2F to 6B			Fixed data-1 (Initialized data)
6C			Fixed data-2
6D			Fixed data-1 (Initialized data)
6E			Fixed data-2
6F to 84			Fixed data-1 (Initialized data)
85			Fixed data-2
86			
87			
88 to 8A			Fixed data-1 (Initialized data)
8B			Fixed data-2
8C to A8			Fixed data-1 (Initialized data)
A9			Fixed data-2
AA			
AB			
AC			
AD			
AE			
AF			
B0			
B1			
B2			Fixed data-1 (Initialized data)
B3			Fixed data-2
B4 to FF			Fixed data-1 (Initialized data)

1-4. CAMERA SYSTEM ADJUSTMENTS

Before perform the camera system adjustments, check that the specified values of "VIDEO SYSTEM ADJUSTMENTS" are satisfied. (Except "36MHz Origin Oscillation Adjustment")
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

1. 36MHz Origin Oscillation Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

Set the frequency of the clock for synchronization.
If deviated, the synchronization will be disrupted and the color will become inconsistent.

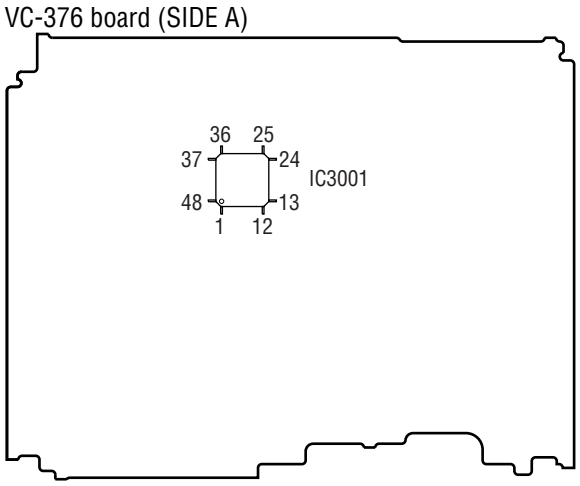
Subject	Not required
Measurement Point	Pin ⑫ of IC3001 (Non MS model) Pin ⑫ of IC3101 (MS model)
Measuring Instrument	Frequency counter
Adjustment Page	F
Adjustment Address	10
Specified value	f = 18000000 ± 90 Hz

Note 1: Check that the data of page: 0, address: 10 is "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	F	10		Change the data and set the frequency (f) to the specified value.
3	F	10		Press PAUSE button.
4	0	01	00	

Non MS model



MS model

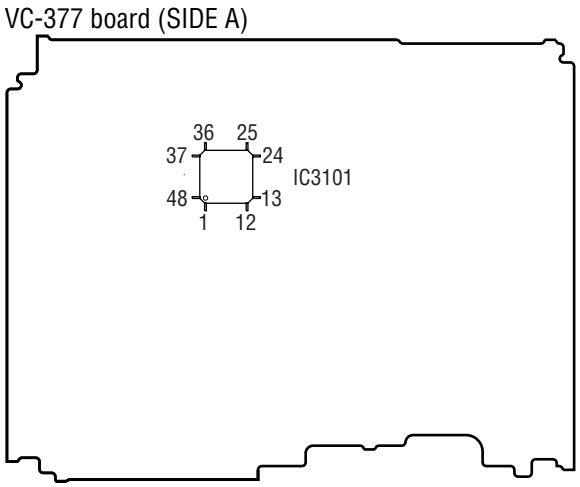


Fig. 6-1-8

2. HALL Adjustment RadarW

For detecting the position of lens iris, adjust the hall AMP gain and offset.

Subject	Not required
Measurement Point	Displayed data of page: 1 (Note 3)
Measuring Instrument	Adjusting remote commander
Adjustment Page	F
Adjustment Address	12 to 18
Specified value	Non MS model: 87 to 8B during IRIS OPEN 15 to 19 during IRIS CLOSE MS model: 15 to 19 during IRIS OPEN 87 to 8B during IRIS CLOSE

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 3: The right two digits of the page: 1 displayed data of the adjusting remote commander.

1:00:XX
└Displayed data

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	D0	40	Non MS model only. (Note 4)
3	6	01	6D	Press PAUSE button. (Note 5)
4	6	02		Check the data changes to "01".

Note 5: The adjustment data will be automatically input to page: F, address: 12 to 18.

Checking method:

Order	Page	Address	Data	Procedure
1	0	03	03	
2	6	01	01	Press PAUSE button.
3	1			Check that the displayed data (Note 3) during IRIS OPEN satisfied the specified value.
4	6	01	03	Press PAUSE button.
5	1			Check that the displayed data (Note 3) during IRIS CLOSE satisfied the specified value.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	0	03	00	
3	0	01	00	

3. Flange Back Adjustment RadarW
(Using the minipattern box or flange back adjustment jig)

The inner focus lens flange back adjustment is carried out automatically. In whichever case, the focus will be deviated during auto focusing/manual focusing.

Subject	Siemens star chart with ND filter for minipattern box (Note 1) or flange back adjustment jig
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 44 to 54 MS model: 44 to 55
Specified value	Data of page: 6, address: 0C is "00"

Note 1: Dark Siemens star chart.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: Perform the adjustment with the camcorder in horizontal state.
Note 5: Perform "HALL Adjustment" before this adjustment.
Note 6: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) COLOR SLOW S (Menu setting) ..... OFF (MS model)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	01	
3	6	01	13	Press PAUSE button.
4	6	01	27	Press PAUSE button. (Note 7)
5	6	02		Check the data changes to "01".
6	6	0C		Check the data is "00".

Note 7: The adjustment data will be automatically input to page: F, address: 44 to 54 (Non MS model)/44 to 55 (MS model).

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	01	25	Press PAUSE button.
3	6	01	00	Press PAUSE button.
4	6	48	00	
5	0	01	00	
6				Perform "Flange Back Check".

Preparations (Using the minipattern box)

1) The minipattern box is installed as shown in the following figure.
Note 8: The attachment lenses are not used.
2) Install the minipattern box so that the distance between it and the front of lens of camcorder is less than 3 cm.
3) Make the height of minipattern box and the camera equal.
4) Check the output voltage of the regulated power supply is the specified voltage ± 0.01 Vdc.
5) Check that the center of Siemens star chart meets the center of shot image screen with the zoom lens at TELE end and WIDE end respectively.

Specified voltage: The specified voltage varies according to the minipattern box, so adjust the power supply output voltage to the specified voltage written on the sheet which is supplied with the minipattern box.

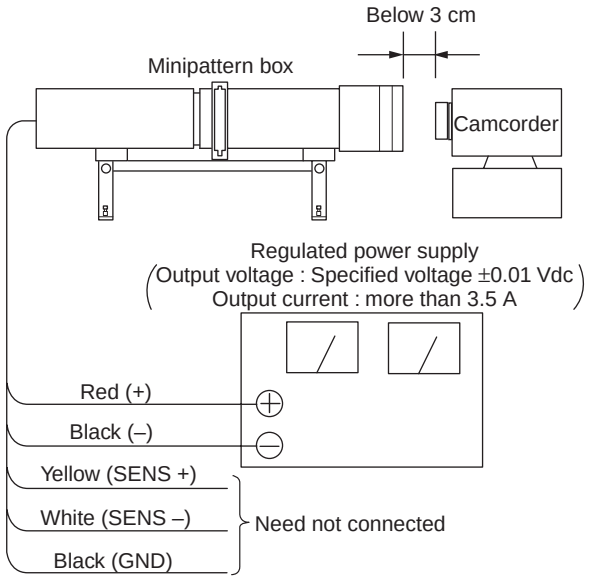


Fig. 6-1-9

PPreparation (Using the flange back adjustment jig) (Luminance: about 300 lux)

1) Install the flange back adjustment jig so that the distance between it and the front of lens of camera is less than 3 cm.
2) Make the height of flange back adjustment jig and the camera equal.
3) Check that the center of chart meets the center of shot image screen with the zoom lens at TELE end and WIDE end respectively.

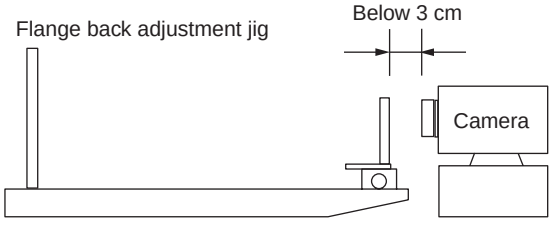


Fig. 6-1-10

4. Flange Back Adjustment (Using the flange back adjustment chart and subject more than 500 m away)

The inner focus lens flange back adjustment is carried out automatically. In whichever case, the focus will be deviated during auto focusing/manual focusing.

4-1. Flange Back Adjustment (1) RadarW

Subject	Flange back adjustment chart (2.0 m from the front of lens) (Luminance: 300 to 400 lux)
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 44 to 54 MS model: 44 to 55
Specified value	Data of page: 6, address: 0C is “00”

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: Check that the data of page: 6, address: 02 is “00”. If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 3: Perform the adjustment with the camcorder in horizontal state.

Note 4: Perform “HALL Adjustment” before this adjustment.

Note 5: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) COLOR SLOW S (Menu setting) ..... OFF (MS model)

Preparations before adjustments:

1) Place the Flange back adjustment chart 2.0 m from the front of the lens.
2) Check that the center of Flange back adjustment chart meets the center of shot image screen with the zoom lens at TELE end and WIDE end respectively.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	01	
3	6	01	13	Press PAUSE button.
4	6	01	15	Press PAUSE button. (Note 6)
5	6	02		Check the data changes to “01”.
6	6	0C		Check the data is “00”.

Note 6: The adjustment data will be automatically input to page: F, address: 44 to 54 (Non MS model)/44 to 55 (MS model).

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	01	25	Press PAUSE button.
3	6	01	00	Press PAUSE button.
4	6	48	00	
5	0	01	00	
6				Perform “Flange Back Adjustment (2)”.

4-2. Flange Back Adjustment (2) RadarW

Perform this adjustment after performing "Flange Back Adjustment (1)".

Subject	Subject more than 500 m away (Subject with clear contrast such as buildings, etc.)
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 44 to 54 MS model: 44 to 55
Specified value	Data of page: 6, address: 0C is "00"

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) COLOR SLOW S (Menu setting) ..... OFF (MS model)

Preparations before adjustments:

1) Set the zoom lens to the TELE end and expose a subject that is more than 500 m away.
(subjects with clear contrast such as building, etc.)
(Nearby subjects less than 500 m away should not be in the screen)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	01	
3	6	01	13	Press PAUSE button.
4				Place ND filter on the lens so that the optimum image is obtain.
5	6	01	29	Press PAUSE button. (Note 4)
6	6	02		Check the data changes to "01".
7	6	0C		Check the data is "00".

Note 4: The adjustment data will be automatically input to page: F, address: 44 to 54 (Non MS model)/44 to 55 (MS model).

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	01	25	Press PAUSE button.
3	6	01	00	Press PAUSE button.
4	6	48	00	
5	0	01	00	
6				Perform "Flange Back Check".

5. Flange Back Check

Subject	Siemens star (2.0 m from the front of the lens) (Luminance: approx. 200 lux)
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Specified value	Focused at the TELE end and WIDE end

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF

Note 3: When the auto focus is ON, the lens can be checked if it is focused or not by observing the data on the page: 1 of the adjusting remote commander.

1 : 00 : XX
- Odd: Focused
- Even: Unfocused

Checking method:

Order	Page	Address	Data	Procedure
1				Place the Siemens star 2.0 m from the front of the lens.
2				To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appear on the image.
3	6	40	01	
4	6	41	01	
5				Shoot the Siemens star with the zoom TELE end.
6				Turn on the auto focus.
7	0	03	0F	
8	1			Check that the lens is focused. (Note 3)
9	6	21	10	
10				Shoot the Siemens star with the zoom WIDE end.
11				Observe the TV monitor and check that the lens is focused.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	21	00	
2	6	40	00	
3	6	41	00	
4	0	03	00	

6. Optical Axis Adjustment

Correct a deviation of optical axis between the lens and the CCD imager.

If deviated, the screen center will be shifted when the lens is zoomed from TELE end to WIDE end.

Subject	Siemens Star
Measurement Point	Check operation on monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	Non MS model: 5A MS model: 66

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: "Flange Back Adjustment" must be already finished.

Note 3: Check that the data of page: 6, address: 48 is "00". If not, set data: 00 to this address.

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) DIGITAL ZOOM (Menu setting) ..... OFF
3) STEADYSHOT (Menu setting) ..... OFF

Preparation for adjustment:

1) Play a monoscope portion of the System Check tape (XH5-5 (NTSC) or XH5-5P (PAL)).
2) Stick the optical axis deviation specification frame to the monitor screen so that the center of monoscope coincides with the center of specification frame.
3) Select the CAMERA mode (Non MS model) or CAMERA-TAPE mode (MS model).

Adjusting method:

1) Select page: 0, address: 01, and set data: 01.
2) Select page: F, address: 5A (Non MS model) or address: 66 (MS model), and set data: 00, then press the PAUSE button on the adjusting remote commander.
3) Place the Siemens Star at 2 m position away from the lens.
4) Shoot the Siemens Star with the zoom at TELE end.
5) Change the lens direction so that the center of Siemens Star coincides with the center of optical axis deviation specification frame.
6) Shoot the Siemens Star with the zoom at WIDE end.
7) Check on the monitor TV which area the center of Siemens Star exists of the optical axis deviation specification frame.
At this time, measure the amount of deviation "L1" (distance from the center of Siemens Star to the center of optical axis deviation specification frame).
8) From the following table, read correction data according to the area.
9) Select page: F, address: 5A (Non MS model) or address: 66 (MS model), and set correction data, then press the PAUSE button on the adjusting remote commander.
10) Shoot the Siemens Star with the zoom at TELE end.
11) Change the lens direction so that the center of Siemens Star coincides with the center of optical axis deviation specification frame.
12) Shoot the Siemens Star with the zoom at WIDE end.
13) Measure the amount of deviation "L2" (distance from the center of Siemens Star to the center of optical axis deviation specification frame).
14) Compare L1 and L2, and make sure that the L2 is smaller than L1.
If large, select page: F, address: 5A (Non MS model) or address: 66 (MS model), and set data: 00, then press the PAUSE button on the adjusting remote commander.

Area	Deviation Phase	Correction Data
1	22.6° to 67.5°	01
2	67.6° to 112.5°	02
3	112.6° to 157.5°	03
4	157.6° to 202.5°	04
5	202.6° to 247.5°	05
6	247.6° to 292.5°	06
7	292.6° to 337.5°	07
8	337.6° to 22.5°	08

Processing after completion of adjustment:

1) Select page: 0, address: 01, and set data: 00.

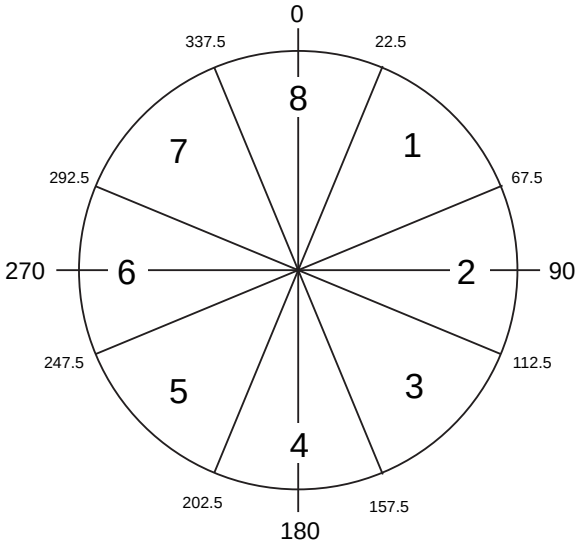


Fig. 6-1-11

7. Picture Frame Setting (Color reproduction adjustment frame)

Subject	Color bar chart (Color reproduction adjustment frame) (1 m (PTB-450) or 40 cm (PTB-1450) from the front of lens)
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope and monitor TV
Specified Value	A=B, C=D, E=F

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Perform "Flange Back Adjustment" and "Optical Axis Adjustment" before this adjustment.
Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Setting method:
1) Select page: 6, address: 48, and set data: 02.
2) Adjust the zoom and the camera direction, and set to the specified position.
3) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "Color reproduction adjustment frame".

Processing after completing camera system adjustments:
1) Select page: 6, address: 48, and set data: 00.

Check on the oscilloscope

1. Horizontal period

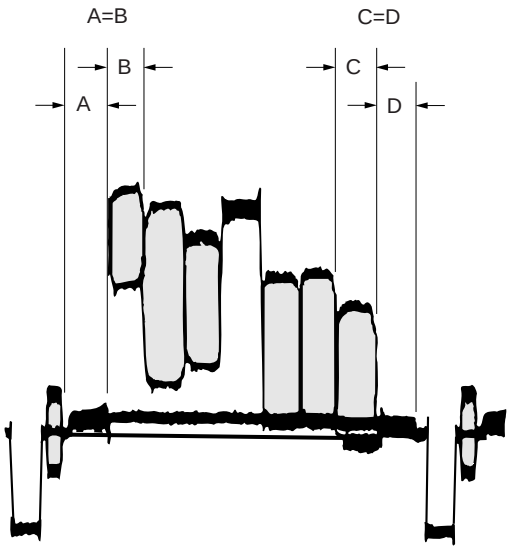


Fig. 6-1-12

2. Vertical period

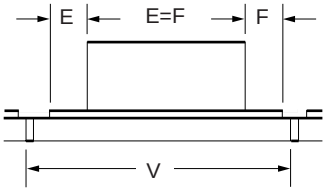


Fig. 6-1-13

Check on the monitor TV (Underscanned mode)

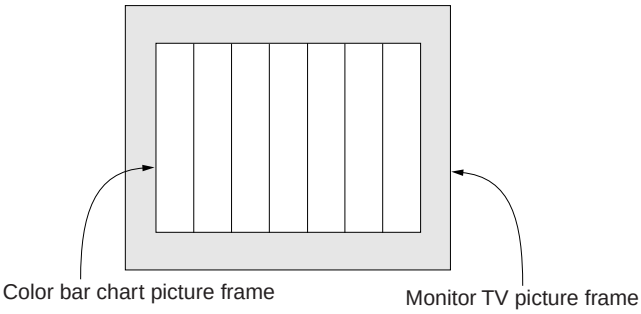


Fig. 6-1-14

8. Picture Frame Setting (Center frame)

Subject	Clear chart (Center frame) (1 m (PTB-450) or 40 cm (PTB-1450) from the front of lens)
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)
Measuring Instrument	Monitor TV
Specified Value	Whole of the screen is white

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) ZOOM ..... WIDE end
4) DIGITAL ZOOM (Menu setting) ..... OFF
5) STEADYSHOT (Menu setting) ..... OFF

Setting method:
1) Select page: 6, address: 48, and set data: 02.
2) Shoot a clear chart in the center of screen with the zoom at WIDE end.
3) Check with the zoom at WIDE end that the clear chart is shot larger than the size shown in the figure. (Fig.6-1-15)
4) In the following adjustment, if the "Center frame" is used, adjust the clear chart to this position.

Processing after completing camera system adjustments:
1) Select page: 6, address: 48, and set data: 00.

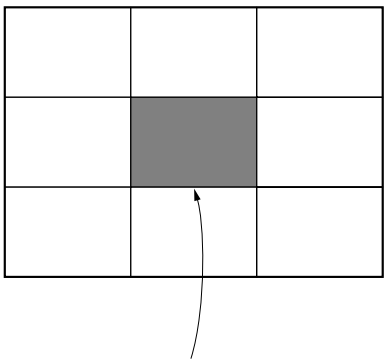


Fig. 6-1-15

9. F No. Standard Data Input RadarW

Adjust the dispersion of the lens iris every F mumber, and compensate the exposure.

Subject	Clear chart (Center frame)
Measuring Instrument	Adjusting remote commander
Adjustment Page	F
Adjustment Address	1C to 23

Note 1: Perform "HALL Adjustment" and "Flange Back Adjustment" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00".
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: If the pattern box (PTB-450) is used, the stability of brightness is reduced, and thus the adjustment value will be shifted a little.
The use of small pattern box (PTB-1450) is recommended.
Note 5: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) ZOOM ..... WIDE end
4) DIGITAL ZOOM (Menu setting) ..... OFF
5) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Center frame". If not, perform "8. Picture Frame Setting (Center Frame)".
2	0	01	01	
3	6	48	02	
4	6	01	BB	Press PAUSE button. (Note 6)
5	6	02		Check the data changes to "01".
6	6	0C		Check the data is "00".

Note 6: The adjustment data will be automatically input to page: F, address: 1C to 23.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	01	00	

10. Mechanical Shutter Adjustment (DCR-HC32/HC32E/HC33/HC33E) RadarW

Adjustment Page	F
Adjustment Address	68 to 7D

Note 1: Check that the data of page: 0, address: 10 is “00”.
Note 2: NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Adjusting method:

1) Select page: 0, address: 01, and set data: 01.
2) Input the following data to page: F, address: 76 to 8B.

Note: Press the PAUSE button of the adjustment remote commander each time to set data.

Address	Data	
	NTSC	PAL
68	7D	80
69	80	80
6A	80	80
6B	80	80
6C	80	80
6D	7C	7F
6E	38	38
6F	B5	6C
70	29	2A
71	EC	5C
72	24	25
73	5C	3C
74	21	22
75	BD	3A
76	1F	20
77	AB	60
78	60	5E
79	78	77
7A	85	84
7B	87	85
7C	7B	7A
7D	1D	1C

3) Select page: 0, address: 01, and set data: 00.

11. Color Reproduction Adjustment

Adjust the color separation matrix coefficient so that proper color reproduction is produced.

Subject	Color bar chart (Color reproduction adjustment frame)
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	33, 35, 3A, 3B
Specified Value	All color luminance points should settle within each color reproduction frame.

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: Perform "Flange Back Adjustment" and "F No. Standard Data Input" before this adjustment.

Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Note 4: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

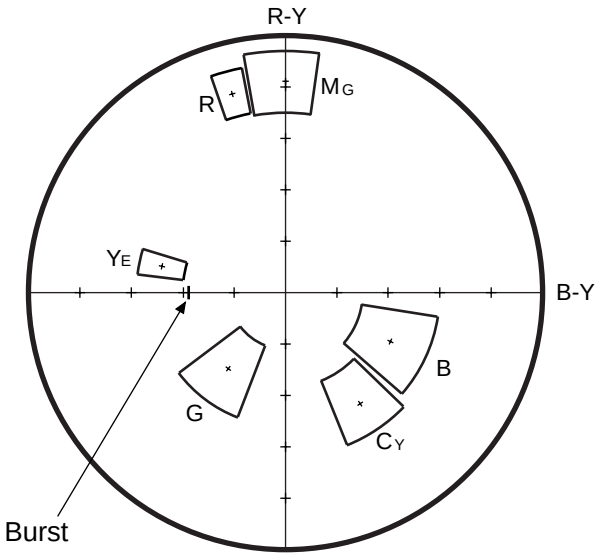
Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	48	02	
3	6	9D		Set the following data. Non MS model 7E: NTSC model 86: PAL model MS model 80: NTSC model 89: PAL model
4	6	01	3D	Press PAUSE button.
5	F	80		Set the following data, and press PAUSE button. 77: NTSC model F7: PAL model
6				Adjust the GAIN and PHASE of the vectorscope, and set to the burst luminance point to the burst position of color reproduction frame.
7	F	33 35 3A 3B		Change the data and settle each color luminance point in each color reproduction frame. (Note 5)

Note 5: Be sure to press the PAUSE button of the adjusting remote commander before changing the addresses. If not, the new data will not be written to the memory.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	6	9D	00	
4	0	01	00	

NTSC model



PAL model

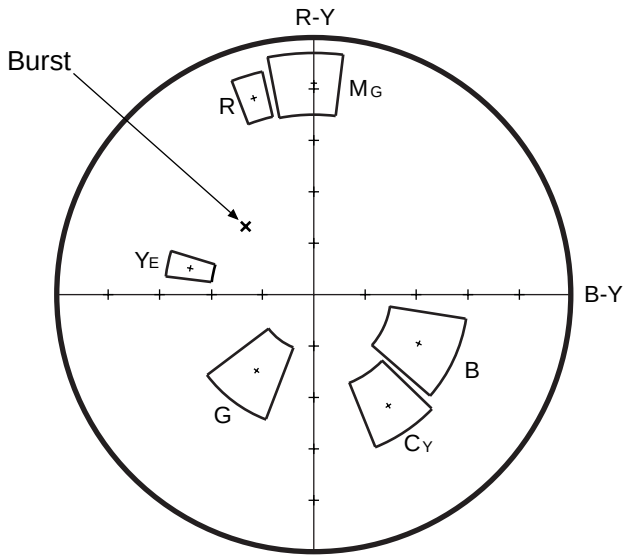


Fig. 6-1-16

12. Auto White Balance Standard Data Input RadarW

Adjust the white balance reference at 3200K.

Subject	Clear chart (Color reproduction adjustment frame)
Adjustment Page	F
Adjustment Address	2A to 2D

Note 1: Perform “Color Reproduction Adjustment” before this adjustment.

Note 2: Check that the data of page: 0, address: 10 is “00”.

Note 3: Check that the data of page: 6, address: 02 is “00”.
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is “Color Reproduction Adjustment Frame”. If not, perform “7. Picture Frame Setting (Color Reproduction Adjustment Frame)”.
2	0	01	01	
3				Wait for 2 seconds.
4	6	48	02	
5	6	01	11	Press PAUSE button.
6	6	01	0B	Press PAUSE button. (Note 5)
7	6	02		Check the data changes to “01”.

Note 5: The adjustment data will be automatically input to page: F, address: 2A to 2D.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	01	00	

13. LV Standard Data Input RadarW

Adjust the normal coefficient of the light value.

Subject	Clear chart (Color reproduction adjustment frame)
Measurement Point	Displayed data of page: 1 (Note 4)
Measuring Instrument	Adjusting remote commander
Adjustment Page	F
Adjustment Address	1A, 1B
Specified Value	0FB0 to 1050

Note 1: Perform “Flange Back Adjustment” and “F No. Standard Data Input” before this adjustment.

Note 2: Check that the data of page: 0, address: 10 is “00”.

Note 3: Check that the data of page: 6, address: 02 is “00”.
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.

Note 4: The right four digits of the page: 1 displayed data of the adjusting remote commander.

1:XX:XX
└ Displayed data

Note 5: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is “Color Reproduction Adjustment Frame”. If not, perform “7. Picture Frame Setting (Color Reproduction Adjustment Frame)”.
2	0	01	01	
3	6	48	02	
4	6	01	0D	Press PAUSE button. (Note 6)
5	6	02		Check the data changes to “01”.
6	0	03	1E	
7	1			Check that the displayed data (Note 4) satisfied specified value.

Note 6: The adjustment data will be automatically input to page: F, address: 1A and 1B.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	03	00	
4	0	01	00	

14. Auto White Balance Adjustment RadarW

Adjust to the proper auto white balance output data.
If it is not correct, auto white balance and color reproducibility will be poor.

Subject	Clear chart (Color reproduction adjustment frame)
Filter	Filter C14 for color temperature correction
Adjustment Page	F
Adjustment Address	2E to 31, 3E to 41

Note 1: Perform "Auto White Balance Standard Data Input" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00".
If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Color Reproduction Adjustment Frame". If not, perform "7. Picture Frame Setting (Color Reproduction Adjustment Frame)".
2				Place the C14 filter on the lens.
3	0	01	01	
4	6	48	02	
5	F	3E		Set the following data, and press PAUSE button. 29: NTSC model 2A: PAL model
6	F	3F		Set the following data, and press PAUSE button. F8: NTSC model B8: PAL model
7	F	40	5B	Press PAUSE button.
8	F	41	20	Press PAUSE button.
9	6	01	83	Press PAUSE button.
10	6	01	81	Press PAUSE button. (Note 6)
11	6	02		Check the data changes to "01".

Note 6: The adjustment data will be automatically input to page: F, address: 2E to 31.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	01	00	
4				Remove the C14 filter on the lens.

15. Auto White Balance Check RadarW

Subject	Clear chart (Color reproduction adjustment frame)	
Filter	Filter C14 for color temperature correction ND filter 1.0, 0.4 and 0.1	
Measurement Point	Video terminal of A/V OUT jack or A/V jack (75 Ω terminated)	Displayed data of page: 1 (Note 3)
Measuring Instrument	Vectorscope	Adjusting remote commander
Specified Value	Fig. 6-1-17 (A) and (B)	NTSC model R ratio: 29B8 to 2A38 B ratio: 5AE0 to 5B60 InOut data: 8000 to 8BC0
		PAL model R ratio: 2A78 to 2AF8 B ratio: 5AE0 to 5B60 InOut data: 8000 to 8BC0

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Perform "Auto White Balance Adjustment" before this adjustment.
Note 3: The right four digits of the page: 1 displayed data of the adjusting remote commander.

1:XX:XX
└ Displayed data

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADYSHOT (Menu setting) ..... OFF

Checking method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Color Reproduction Adjustment Frame". If not, perform "7. Picture Frame Setting (Color Reproduction Adjustment Frame)".
2				Check that the lens is not covered with either filter.
3	6	48	02	
INDOOR check				
4	6	01	0F	Press PAUSE button.
5				Check that the center of the white luminance point within the circle shown Fig. 6-1-17 (A)
6	6	01	00	Press PAUSE button.
OUTDOOR check				
7				Place the C14 filter on the lens.
8	6	01	3F	Press PAUSE button.
9				Check that the center of the white luminance point within the circle shown Fig. 6-1-17 (B)
10	0	03	04	
11	1			Check that the displayed data (Note 3) satisfied the R ratio specified value.
12	0	03	05	
13	1			Check that the displayed data (Note 3) satisfied the B ratio specified value.
14				Remove the C14 filter
InOut data check				
15				Place the ND filter 1.5 (1.0 + 0.4 + 0.1) on the lens.
16	6	01	00	Press PAUSE button.
17	0	03	06	
18	1			Check that the displayed data (Note 3) satisfied the InOut data specified value.

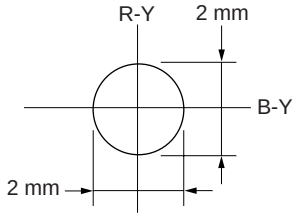


Fig. 6-1-17 (A)

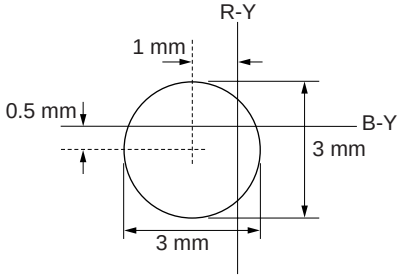


Fig. 6-1-17 (B)

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	01	00	Press PAUSE button.
2	6	48	00	
3	0	03	00	
4				Remove the ND filter 1.5 (1.0 + 0.4 + 0.1) on the lens.

16. MAX GAIN Adjustment RadarW

Setting the minimum illumination.
If it is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	Clear chart (Center frame)
Adjustment Page	F
Adjustment Address	19

Note 1: Perform "Flange Back Adjustment" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the data of page: 6, address: 02 is "00". If not, select page: 6, address: 01, set data: 00, and press the PAUSE button.
Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E
Note 5: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) NIGHTSHOT PLUS ..... OFF
3) ZOOM ..... WIDE end
4) DIGITAL ZOOM (Menu setting) ..... OFF
5) STEADYSHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Check that the picture frame is "Center Frame". If not, perform "8. Picture Frame Setting (Center Frame)".
2	0	01	01	
3	6	48	02	
4	6	96		Set the following data. Non MS model 26: NTSC model 1B: PAL model MS model 24: NTSC model 1B: PAL model
5	6	97	00	
6	6	01	6F	Press PAUSE button. (Note 6)
7	6	02		Check the data changes to "01".

Note 6: The adjustment data will be automatically input to page: F, address: 19.

Processing after completing adjustment:

Order	Page	Address	Data	Procedure
1	6	48	00	
2	6	96	00	
3	6	97	00	
4	6	01	00	Press PAUSE button.
5	0	01	00	
6				Wait for 3 seconds.

17. Steadyshot Check RadarW

Precautions on the parts replacement

There are two types of repair parts.

Type A ENC03MA
Type B ENC03MB

Replace the broken sensor with a same type sensor. If replace with other type parts, the image will vibrate up and down or left and right during hand-shake correction operations.

Precautions on angular velocity sensor

The sensor incorporates a precision oscillator. Handle it with care as if it dropped, the balance of the oscillator will be disrupted and operations will not be performed properly.

Subject	Not required
Measurement Point	Displayed data of page: 1 (Note 2)
Measuring Instrument	Adjusting remote commander
Specified value	PITCH data: 2680 to 5080 YAW data: 2680 to 5080

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: The right four digits of the page: 1 displayed data of the adjusting remote commander.

1:XX:XX
└── Displayed data

Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:

1) POWER ..... CAMERA mode (Non MS model)
CAMERA-TAPE mode (MS model)
2) ZOOM ..... TELE end
3) STEADYSHOT (Menu setting) ..... ON

Checking method:

Order	Page	Address	Data	Procedure
PITCH sensor output check (SE601 of SI-042 board)				
1	0	03	11	
2	1			With the set in still state, check that the displayed data (Note 2) satisfies the PITCH data specified value.
YAW sensor output check (SE602 of SI-042 board)				
3	0	03	12	
4	1			With the set in still state, check that the displayed data (Note 2) satisfies the YAW data specified value.
5	0	03	00	
Steadyshot operation check				
6				Shake the set vertically and horizontally to check that the steadyshot function operates normally.

1-5. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS

Before perform the electronic viewfinder system adjustments, check that the data of page: 0, address: 10 is “00”. If not, select page: 0, address: 10, and set the data “00”.

Note 1: Taken an extreme care not to destroy the liquid crystal display module by static electricity when replacing it.

Note 2: Perform the following data setting before the viewfinder system adjustments.
1) Select page: 3, address: C4, and set data: 67.
2) Select page: 3, address: C5, and set data: 01.
Reset the data after completing adjustment.
1) Select page: 3, address: C4, and set data: 00.
2) Select page: 3, address: C5, and set data: 00.

1. EVF Automatic Adjustment (LB-109 board)

RadarW

This adjustment does the following items automatically.
VCO Adjustment
Contrast Adjustment

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Adjustment Page	C
Adjustment Address	3F, 40 (VCO Adjustment) 47 (Contrast Adjustment)

Note 1: Check that the data of page: 0, address: 10 is “00”.

Note 2: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	71	00	Press PAUSE button.
3	3	01	5A	Press PAUSE button. (Note 3)
4	3	02		Check the data changes to “00”.
5	3	03		Check the data is “00”. (Note 4)
6	C	3F		Read the data and this data is named D_{3F}.
7				Convert D_{3F} to decimal notation, and obtain D_{3F}’. (Note 5)
8				Calculate D_{40}’ using following equations. (decimal calculation) D_{40}’ = D_{3F}’ + 10 (NTSC model) D_{40}’ = D_{3F}’– 10 (PAL model)
9				Convert D_{40}’ to a hexadecimal number, and obtain D_{40}. (Note 5)
10	C	40	D_{40}	Press PAUSE button.
11	C	71	41	Press PAUSE button.
12	0	01	00	

Note 3: The adjustment data will be automatically input to page: C, address: 3F and 47.

Note 4: If the data change to “01”, adjustment has error. Contents of error is written into page: 3, address: C6. See the following table.

Note 5: Refer to table 6-4-1. “Hexadecimal-decimal conversion table”.

Data of page: 3, address: C6	Contents of error
5E	VCO adjustment error
61	Contrast adjustment error

1-6. LCD SYSTEM ADJUSTMENTS

Before perform the LCD system adjustments, check that the data of page: 0, address: 10 is “00”.
If not, select page: 0, address: 10, and set the data “00”.

Note 1: Taken an extreme care not to destroy the liquid crystal display module by static electricity when replacing it.
Note 2: Set the “LCD BRIGHT”, “LCD COLOR” to the center with the menu settings of the touch panel.
Note 3: Open the LCD panel during the LCD system adjustment.
Note 4: NTSC model: DCR-HC21/HC32/HC33
PAL model: DCR-HC17E/HC19E/HC21E/HC22E/HC32E/HC33E

1. LCD Automatic Adjustment (PD-237 board)

RadarW

This adjustment does the following items automatically.
VCO Adjustment
Contrast Adjustment

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Adjustment Page	C
Adjustment Address	50, 51 (VCO Adjustment) 58 (Contrast Adjustment)

Note 1: Check that the data of page: 0, address: 10 is “00”.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	70	00	Press PAUSE button.
3	3	01	5A	Press PAUSE button. (Note 2)
4	3	02		Check the data changes to “00”.
5	3	03		Check the data is “00”. (Note 3)
6	C	50		Read the data and this data is named D_{50}.
7				Convert D_{50} to decimal notation, and obtain D_{50}’. (Note 4)
8				Calculate D_{51}’ using following equations. (decimal calculation) $D_{51}' = D_{50}' + 10$ (NTSC model) $D_{51}' = D_{50}' - 10$ (PAL model)
9				Convert D_{51}’ to a hexadecimal number, and obtain D_{51}. (Note 4)
10	C	51	D_{51}	Press PAUSE button.
11	C	70	41	Press PAUSE button.
12	0	01	00	

Note 2: The adjustment data will be automatically input to page: C, address: 50 and 58.
Note 3: If the data change to “01”, adjustment has error. Contents of error is written into page: 3, address: C6. See the following table.
Note 4: Refer to table 6-4-1. “Hexadecimal-decimal conversion table”.

Data of page: 3, address: C6	Contents of error
58	VCO adjustment error
60	Contrast adjustment error

2. V-COM Adjustment (PD-237 board)

Set the DC bias of the common electrode drive signal of LCD to the specified value.
If deviated, the LCD display will be move, producing flicker and conspicuous vertical lines.

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Measurement Point	Check on LCD screen
Measuring Instrument	
Adjustment Page	C
Adjustment Address	52
Specified Value	The brightness difference between the section-A and section-B is minimum

Note 1: Perform "LCD Automatic Adjustment" before this adjustment.
Note 2: Check that the data of page: 0, address: 10 is "00".

Switch setting:
LCD BACKLIGHT ..... ON

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	61	CD	Press PAUSE button.
3	C	52		Change the data so that brightness of the section A and section B is equal.
4	C	52		Subtract 5 from the data.
5	C	52		Press PAUSE button.
6	C	61	C5	Press PAUSE button.
7	0	01	00	

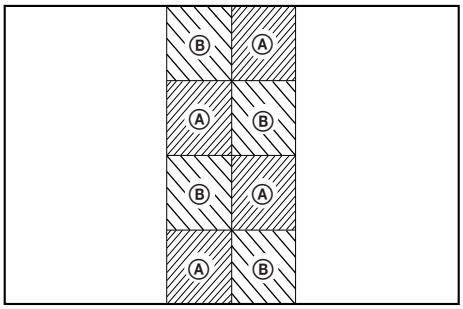


Fig. 6-1-18

3. Transmissive Mode White Balance Adjustment (PD-237 board)

Correct the white balance at transmissive mode.
If deviated, the LCD screen color cannot be reproduced.

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Measurement Point	Check on LCD screen
Measuring Instrument	
Adjustment Page	C
Adjustment Address	56, 57
Specified Value	LCD screen must not be colored

Note 1: Check that the data of page: 0, address: 10 is "00".
Note 2: Check the white balance only when replacing the following parts. If necessary, adjust them.
1. LCD block
2. Light induction plate
3. IC602

Note 3: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Switch setting:
LCD BACKLIGHT ..... ON

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	C	56		Set the following data, and Press PAUSE button. 7D: Non MS model 88: MS model
3	C	57		Set the following data, and Press PAUSE button. 73: Non MS model 71: MS model
4				Check that the LCD screen is not colored. If not colored, proceed to step 6.
5	C	56 57		Change the data so that the LCD screen is not colored. (Note 4)
6	0	01	00	

Note 4: To write in the non-volatile memory (EEPROM), press the PAUSE button each time to set the data.

6-2. MECHANISM SECTION ADJUSTMENTS

On the mechanism section adjustment

For details of mechanism section adjustments, checks, and replacement of mechanism parts, refer to the separate volume "DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) Mechanism ".

Note 1: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

2-1. HOW TO ENTER RECORD MODE WITHOUT CASSETTE

1) Connect the adjustment remote commander to the LANC jack.
2) Turn the HOLD switch of the adjustment remote commander to the ON position.
3) Close the cassette compartment without the cassette.
4) Select page: 3, address: 01, set data: 0C, and press the PAUSE button of the adjustment remote commander.
(The mechanism enters the record mode automatically.)
Note: The function buttons become inoperable.
5) To quit the record mode, select page: 3, address: 01, set data: 00, and press the PAUSE button of the adjustment remote commander. (Whenever you want to quit the record mode, be sure to quit following this procedure.)

2-2. HOW TO ENTER PLAYBACK MODE WITHOUT CASSETTE

1) Connect the adjustment remote commander to the LANC jack.
2) Turn the HOLD switch of the adjustment remote commander to the ON position.
3) Close the cassette compartment without the cassette.
4) Select page: 3, address: 01, set data: 0B, and press the PAUSE button of the adjustment remote commander.
(The mechanism enters the playback mode automatically.)
Note: The function buttons become inoperable.
5) To quit the playback mode, select page: 3, address: 01, set data: 00, and press the PAUSE button of the adjustment remote commander. (Whenever you want to quit the playback mode, be sure to quit following this procedure.)

2-3. TAPE PATH ADJUSTMENT

1. Preparation for Adjustment

1) Clean the tape running side (tape guide, drum, capstan shaft, pinch roller, etc.).
2) Connect the adjustment remote commander to the LANC jack.
3) Turn the HOLD switch of the adjustment remote commander to the ON position.
4) Connect an oscilloscope to CN1007 of VC-376 board (Non MS model) or VC-377 board (MS model) via CPC-15 (J-6082-564-A) and I/F unit for LANC control (J-6082-521-A).
Channel 1: VC-376 board (Non MS model) or VC-377 board (MS model), CN1007 Pin ① (Note)
External trigger: VC-376 board (Non MS model) or VC-377 board (MS model), CN1007 Pin ②

Note: Connect a 75 Ω resistor between pins ① of CN1007 and ③ (GND).
75 Ω resistor (Parts code: 1-247-804-11)

5) Playback the alignment tape for tracking. (XH2-1)
6) Select page: 3, address: 33, and set data: 08.
7) Select page: 3, address: 26, set data: 31, and press the PAUSE button.
8) Check that the oscilloscope RF waveform is normal at the entrance and exit.
If not normal, adjust according to the separate volume "DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) Mechanism" .

CN1007 of VC-376 board (Non MS model) or VC-377 board (MS model)

Pin No.	Signal Name
1	RF_MON
2	SWP
3	GND
4	XCS EEP
5	EEP SCK
6	EEP SO
7	EEP SI
8	GND

2. Procedure after operations

1) Connect the adjustment remote commander to the LANC jack and set the HOLD switch to the ON position.
2) Select page: 3, address: 26, set data: 00, and press the PAUSE button.
3) Select page: 3, address: 33, and set data: 00.

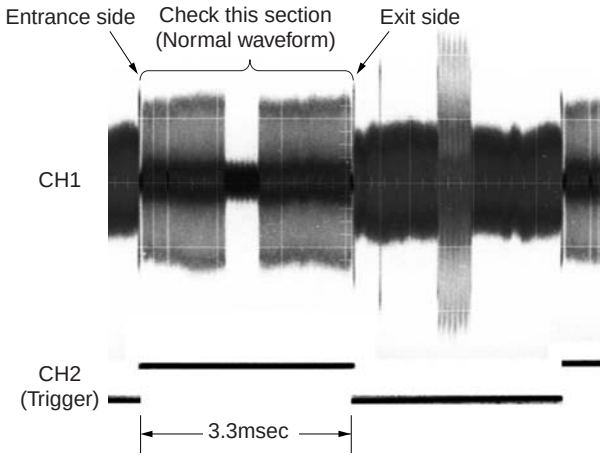


Fig. 6-2-1

6-3. VIDEO SECTION ADJUSTMENTS

3-1. PREPARATIONS BEFORE ADJUSTMENTS

Use the following measuring instruments for video section adjustments.

3-1-1. Equipment Required

1) TV monitor
2) Oscilloscope (dual-phenomenon, band above 30 MHz with delay mode) (Unless specified otherwise, use a 10 : 1 probe.)
3) Pattern generator with video output terminal.
4) Audio generator
5) Audio level meter
6) Audio distortion meter
7) Audio attenuator
8) AC power adapter
9) Alignment tapes
   - Tracking standard (XH2-1)
     Parts code: 8-967-997-01
   - SW/OL standard (XH2-3)
     Parts code: 8-967-997-11
   - Audio operation check for NTSC (XH5-3)
     Parts code: 8-967-997-51
   - System operation check for NTSC (XH5-5)
     Parts code: 8-967-997-61
   - Audio operation check for PAL (XH5-3P)
     Parts code: 8-967-997-55
   - System operation check for PAL (XH5-5P)
     Parts code: 8-967-997-66
10) Adjustment remote commander (J-6082-053-B)
11) CPC connecting jigs
   - CPC-15 (J-6082-564-A)
   - I/F unit for LANC control (J-6082-521-A)

3-1-2. Precautions on Adjusting

Note: Before performing the adjustment, check the data of page: 0, address: 10 is “00”. If not, select page: 0, address: 00, and set data “00”.

1) The adjustments of this unit are performed in the VTR mode (PLAY/EDIT mode) or camera mode (CAMER mode or CAMERA-TAPE mode).

3-1-3. Adjusting Connectors

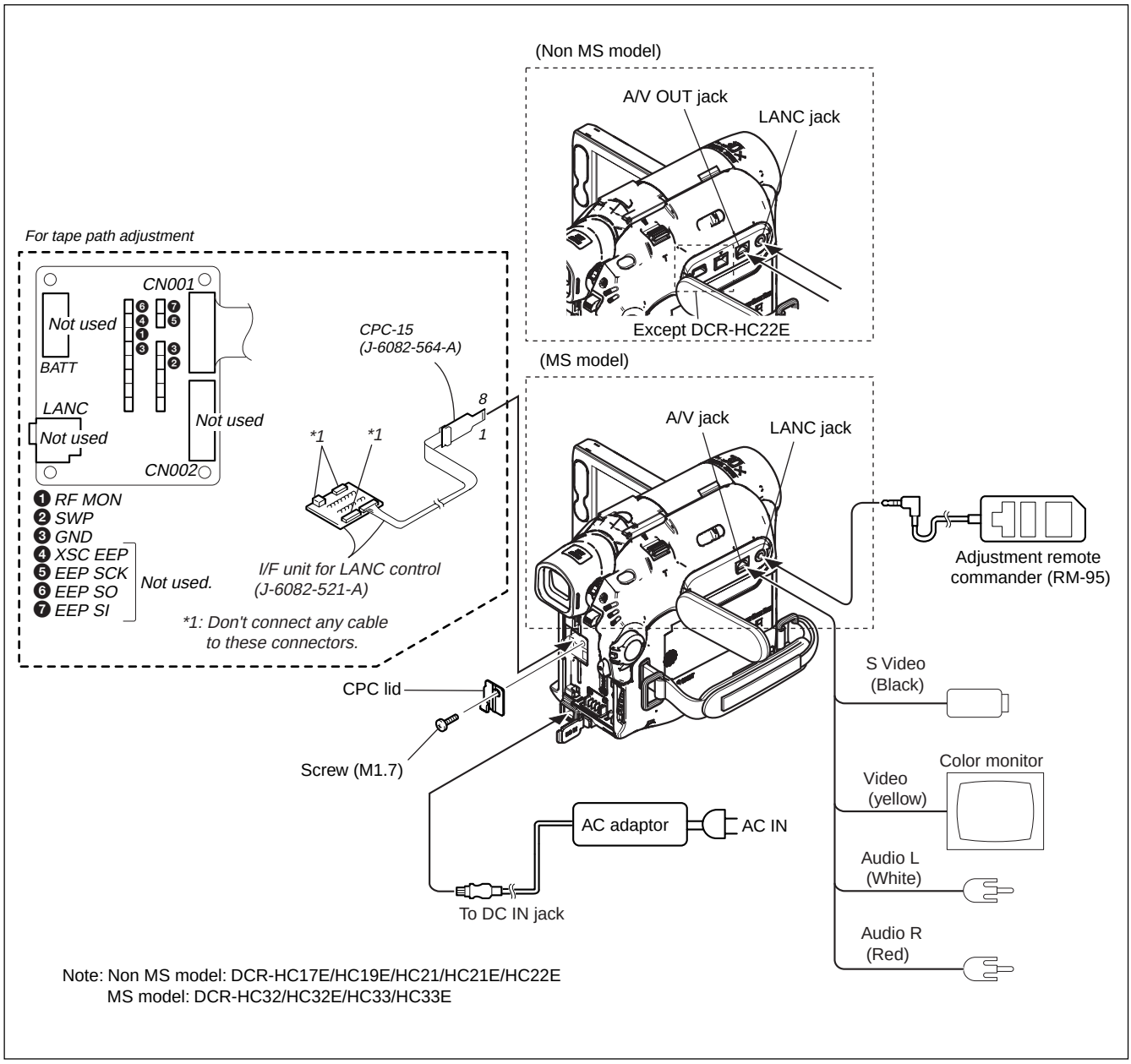
The measuring point of the playback RF signal is CN1007 of VC-376 board or VC-377 board. Connect the measuring instruments via the CPC-15 jig (J-6082-564-A) and I/F unit for LANC control (J-6082-521-A). Refer to “MECHANISM SECTION ADJUSTMENT” for the measuring method. The following table lists the pin numbers and signal names of CN1007.

Pin No.	Signal Name
1	RF_MON
2	SWP
3	GND
4	XCS EEP
5	EEP SCK
6	EEP SO
7	EEP SI
8	GND

Table 6-3-1

3-1-4. Connecting the Equipment

Connect the measuring instruments as shown in Fig. 6-3-1, and perform the adjustments.



Note: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Fig. 6-3-1

3-1-5. Alignment Tapes

Use the alignment tapes shown in the following table.
Use tapes specified in the signal column of each adjustment.

Name	Use
Tracking standard (XH2-1)	Tape path adjustment
SW/OL standard (XH2-3)	Switching position adjustment
Audio operation check (XH5-3(NTSC), XH5-3P(PAL))	Audio system adjustment
System operation check (XH5-5(NTSC), XH5-5P(PAL))	Operation check

Fig. 6-3-2 shows the 75% color bar signals recorded on the alignment tape for Audio Operation Check.

Note: Measure with video terminal (Terminated at 75 Ω)

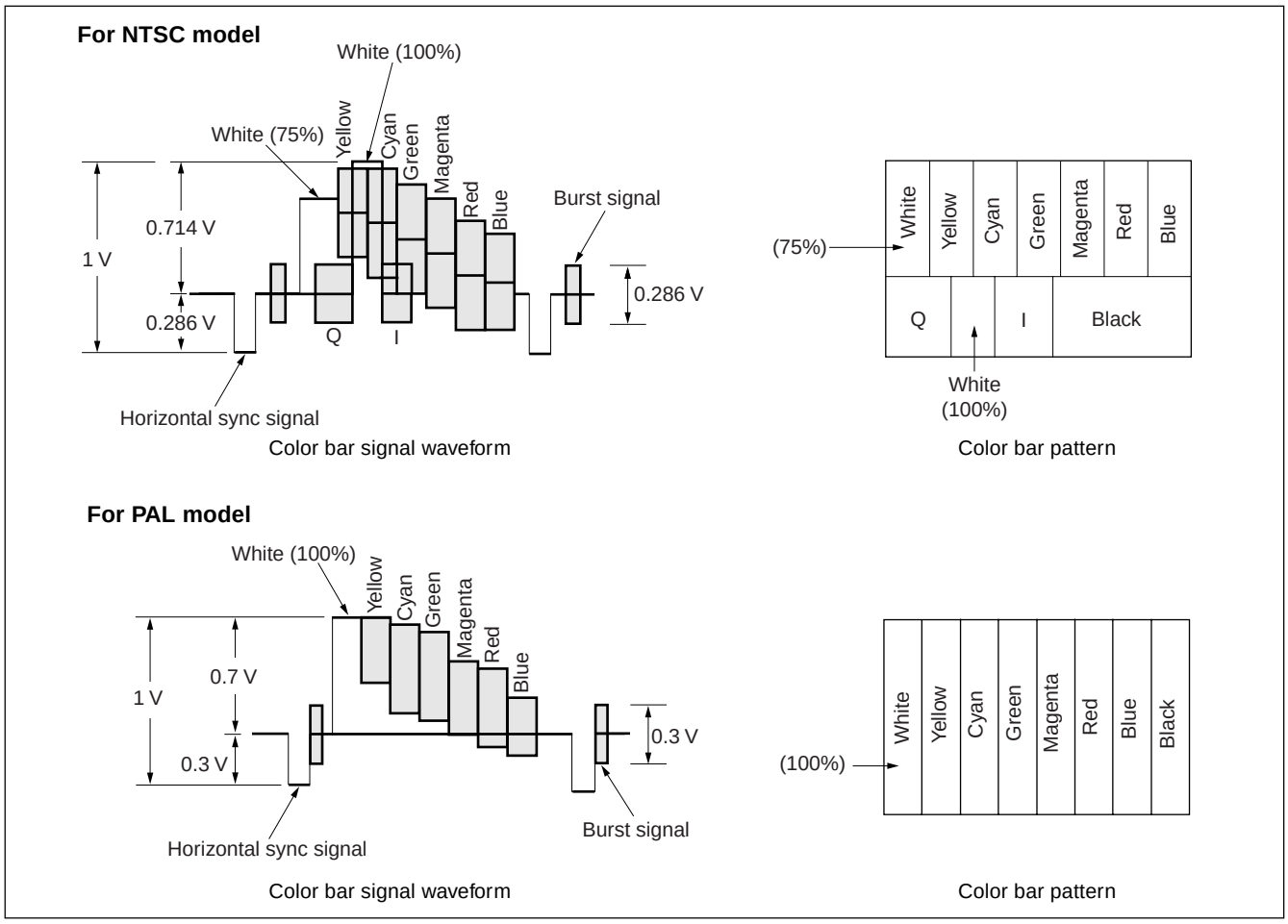


Fig. 6-3-2. Color bar signal of alignment tapes

3-1-6. Input/Output Level and Impedance

Video input/output
A/V jack
Video signal: 1 Vp-p, 75 Ω unbalanced, sync negative

S video input/output
A/V jack
Luminance signal: 1 Vp-p, 75 Ω unbalanced, sync negative
Chrominance signal: 0.286 Vp-p, 75Ω unbalanced (NTSC)
: 0.300 Vp-p, 75Ω unbalanced (PAL)

Audio input/output
A/V jack
Input level: 327mV
Input impedance: More than 47 kΩ
Output level: 327mV (at load impedance 47 kΩ)
Output impedance: Below 2.2 kΩ

3-2. SYSTEM CONTROL SYSTEM ADJUSTMENTS

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

1. Initialization of 8, A, C, D, E, F, 1C, 1F Page Data (Non MS model)

If the 8, A, C, D, E, F, 1C, 1F page data is erased due to some reason, perform "1-2. INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA" of "CAMERA SYSTEM ADJUSTMENTS".
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

2. Touch Panel Adjustment (Non MS model)

Adjust the calibration of touch panel.

Mode	VTR stop (PLAY/EDIT mode)
Signal	Arbitrary
Adjustment Page	A
Adjustment Address	82 to 85

Note 1: This adjustment should be carried out upon completetion of the LCD system adjustments.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that the LCD panel is not reverse mode.
Note 4: Adjustment must be performed while observing the LCD screen from the front.

Preparation:

Order	Page	Address	Data	Procedure
1	7	05	01	
2				Check that the touch panel adjustment screen is displayed.
3				Perform "Adjusting method".

Adjusting method:

1) Using a ball-point pen etc., push the center of "×" indicated in the part A.
2) Using a ball-point pen etc., push the center of "×" indicated in the part B.
3) Using a ball-point pen etc., push the center of "×" indicated in the part C.

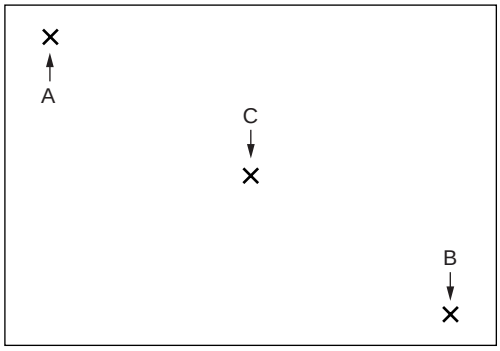


Fig. 6-3-3

3. Initialization of 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F Page Data (MS model)

If the 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F page data is erased due to some reason, perform "1-3. INITIALIZATION OF 8, A, B, C, D, E, F, 18, 19, 1A, 1B, 1C, 1E, 1F PAGE DATA" of "CAMERA SYSTEM ADJUSTMENTS".
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

4. Touch Panel Adjustment (MS model)

Adjust the calibration of touch panel.

Mode	VTR stop (PLAY/EDIT mode)
Signal	Arbitrary
Adjustment Page	A
Adjustment Address	90 to 93

Note 1: This adjustment should be carried out upon completetion of the LCD system adjustments.
Note 2: Check that the data of page: 0, address: 10 is "00".
Note 3: Check that a Memory Stick Duo is not insteted.
Note 4: Check that the LCD panel is not reverse mode.
Note 5: Adjustment must be performed while observing the LCD screen from the front.

Preparation:

Order	Page	Address	Data	Procedure
1	5	01	01	
2	5	05	00	
3	5	06	C7	
4	5	07	00	
5	5	08	00	
6	5	09	00	
7	5	0A	FF	
8	5	0B	00	
9	5	0C	00	
10	5	0D	00	
11	5	0E	01	
12	5	00	01	Press PAUSE button.
13				Check that the touch panel adjustment screen is displayed.
14				Perform "Adjusting method".

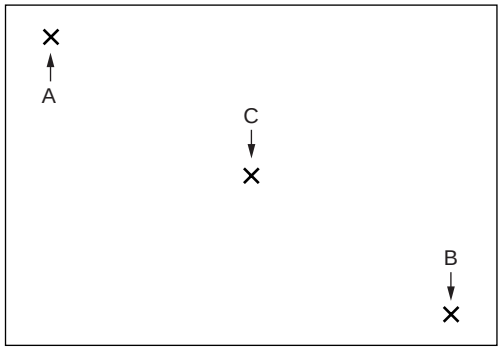


Fig. 6-3-4

Adjusting method:

1) Using a ball-point pen etc., push the center of "×" indicated in the part A.
2) Using a ball-point pen etc., push the center of "×" indicated in the part B.
3) Using a ball-point pen etc., push the center of "×" indicated in the part C.

5. Node Unique ID No. Input

Write the serial No. and model code to the EEPROM (nonvolatile memory).

In writing the serial No., a decimal number should be converted into a hexadecimal number.

Note 1: Check that the data of page: 0, address: 10 is "00".

Note 2: Perform "Node Unique ID No. Input" if the data on page C has been cleared and the node unique ID No. is not found.

Page	C
Address	E5, E6, E7

1) Select page: 0, address: 01, and set data: 01.
2) Read the serial No. from the model name label, and it is assumed to be D_1.
   Example: If serial No. is "77881",
   $D_1 = 77881$
3) From Table 6-3-2, obtain D_2 and H_1 that correspond to D_1.
   Example: If $D_1 = 77881$,
   $D_2 = D_1 - 65536 = 12345$
   $H_1 = FE$

D_1 (decimal)	D_2 (decimal)	H_1 (hexadecimal) (Service model code)
00001 to 65535	D_1	FE
65536 to 131071	$D_1 - 65536$	FE
131072 to196607	$D_1 - 131072$	FE
196608 to 262143	$D_1 - 196608$	FE
262144 to 327679	$D_1 - 262144$	FE
327680 to 393215	$D_1 - 327680$	FE
393216 to 458751	$D_1 - 393216$	FE
458752 to 524287	$D_1 - 458752$	FE
524288 to 589823	$D_1 - 524288$	FE
589824 to 655359	$D_1 - 589824$	FE
655360 to 720895	$D_1 - 655360$	FE
720896 to 786431	$D_1 - 720896$	FE
786432 to 851967	$D_1 - 786432$	FE
851968 to 917503	$D_1 - 851968$	FE
917504 to 983039	$D_1 - 917504$	FE
983040 to 999999	$D_1 - 983040$	FE

Table 6-3-2

4) Enter H_1 to address: E5 on page: C.
   Example: If $H_1 = FE$,
   select page: C, address: E5, and set data: FE, then press the PAUSE button.
5) From Table 6-3-3, obtain the maximum decimal number less than D_2, and it is assumed to be D_3.
   Example: If $D_2 = 12345$.
   $D_3 = 12288$
6) From Table 6-3-3, obtain a hexadecimal number that corresponds to D_3, and it is assumed to be H_3.
   Example: If $D_3 = 12288$,
   $H_3 = 3000$
7) Caluculate D_4 using following equations (decimal caluculation). ($0 \leqq D_4 \leqq 225$)
   $D_4 = D_2 - D_3$
   Example: If $D_2 = 12345$ and $D_3 = 12288$,
   $D_4 = 12345 - 12288 = 57$
8) Convert D_4 into a hexadecimal number to obtain H_4. (See Table 6-4-1 "Hexadecimal - decimal conversion table" in 6-4. Service Mode)
   Example: If $D_4 = 57$,
   $H_4 = 39$
9) Enter higher two digits of H_3 to address: E6 on page: C.
   Example: If $H_3 = 3000$,
   select page: C, address: E6, and set data: 30, then press the PAUSE button.
10) Enter H_4 to address: E7 on page: C.
    Example: If $H_4 = 39$,
    select page: C, address: E7, and set data: 39, then press the PAUSE button.
11) Select page: 0, address: 01, and set data: 00.

D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3	D_3	H_3
0	0000	8192	2000	16384	4000	24576	6000	32768	8000	40960	A000	49152	C000	57344	E000
256	0100	8448	2100	16640	4100	24832	6100	33024	8100	41216	A100	49408	C100	57600	E100
512	0200	8704	2200	16896	4200	25088	6200	33280	8200	41472	A200	49664	C200	57856	E200
768	0300	8960	2300	17152	4300	25344	6300	33536	8300	41728	A300	49920	C300	58112	E300
1024	0400	9216	2400	17408	4400	25600	6400	33792	8400	41984	A400	50176	C400	58368	E400
1280	0500	9472	2500	17664	4500	25856	6500	34048	8500	42240	A500	50432	C500	58624	E500
1536	0600	9728	2600	17920	4600	26112	6600	34304	8600	42496	A600	50688	C600	58880	E600
1792	0700	9984	2700	18176	4700	26368	6700	34560	8700	42752	A700	50944	C700	59136	E700
2048	0800	10240	2800	18432	4800	26624	6800	34816	8800	43008	A800	51200	C800	59392	E800
2304	0900	10496	2900	18688	4900	26880	6900	35072	8900	43264	A900	51456	C900	59648	E900
2560	0A00	10752	2A00	18944	4A00	27136	6A00	35328	8A00	43520	AA00	51712	CA00	59904	EA00
2816	0B00	11008	2B00	19200	4B00	27392	6B00	35584	8B00	43776	AB00	51968	CB00	60160	EB00
3072	0C00	11264	2C00	19456	4C00	27648	6C00	35840	8C00	44032	AC00	52224	CC00	60416	EC00
3328	0D00	11520	2D00	19712	4D00	27904	6D00	36096	8D00	44288	AD00	52480	CD00	60672	ED00
3584	0E00	11776	2E00	19968	4E00	28160	6E00	36352	8E00	44544	AE00	52736	CE00	60928	EE00
3840	0F00	12032	2F00	20224	4F00	28416	6F00	36608	8F00	44800	AF00	52992	CF00	61184	EF00
4096	1000	12288	3000	20480	5000	28672	7000	36864	9000	45056	B000	53248	D000	61440	F000
4352	1100	12544	3100	20736	5100	28928	7100	37120	9100	45312	B100	53504	D100	61696	F100
4608	1200	12800	3200	20992	5200	29184	7200	37376	9200	45568	B200	53760	D200	61952	F200
4864	1300	13056	3300	21248	5300	29440	7300	37632	9300	45824	B300	54016	D300	62208	F300
5120	1400	13312	3400	21504	5400	29696	7400	37888	9400	46080	B400	54272	D400	62464	F400
5376	1500	13568	3500	21760	5500	29952	7500	38144	9500	46336	B500	54528	D500	62720	F500
5632	1600	13824	3600	22016	5600	30208	7600	38400	9600	46592	B600	54784	D600	62976	F600
5888	1700	14080	3700	22272	5700	30464	7700	38656	9700	46848	B700	55040	D700	63232	F700
6144	1800	14336	3800	22528	5800	30720	7800	38912	9800	47104	B800	55296	D800	63488	F800
6400	1900	14592	3900	22784	5900	30976	7900	39168	9900	47360	B900	55552	D900	63744	F900
6656	1A00	14848	3A00	23040	5A00	31232	7A00	39424	9A00	47616	BA00	55808	DA00	64000	FA00
6912	1B00	15104	3B00	23296	5B00	31488	7B00	39680	9B00	47872	BB00	56064	DB00	64256	FB00
7168	1C00	15360	3C00	23552	5C00	31744	7C00	39936	9C00	48128	BC00	56320	DC00	64512	FC00
7424	1D00	15616	3D00	23808	5D00	32000	7D00	40192	9D00	48384	BD00	56576	DD00	64768	FD00
7680	1E00	15872	3E00	24064	5E00	32256	7E00	40448	9E00	48640	BE00	56832	DE00	65024	FE00
7936	1F00	16128	3F00	24320	5F00	32512	7F00	40704	9F00	48896	BF00	57088	DF00	65280	FF00

Note: D_3: Decimal
H_3: Hexadecimal

Table 6-3-3

3-3. SERVO AND RF SYSTEM ADJUSTMENTS

Before perform the servo and RF system adjustments, check that the specified values of "36MHz Origin Oscillation Adjustment" of "1-3. CAMERA SYSTEM ADJUSTMENTS" is satisfied. Check that the data of page: 0, address: 10 is "00". If not, select page: 0, address: 10, and set the data "00".

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Adjusting Procedure:
1. CAP FG duty adjustment
2. Switching position adjustment
3. Error rate check

1. CAP FG Duty Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

RadarW

Set the CAP FG signal duty cycle to 50% to establish an appropriate capstan servo. If deviated, the uneven rotation of capstan and noise can occur in the LP mode.

Mode	VTR stop (PLAY/EDIT mode)
Signal	No signal
Measurement Point	Displayed data of page: 3, address: 03
Measuring Instrument	Adjusting remote commander
Adjustment Page	C
Adjustment Address	16
Specified value	The data of page: 3, address: 03 is "00"

Note 1: Check that the data of page: 0, address: 10 is "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1				Close the cassette compartment without inserting cassette.
2	0	01	01	
3	3	01	1B	Press PAUSE button.
4	3	02		Check the data changes in the following order "1B" → "2B" → "00"
5	3	03		Check the data is "00". (Note 2)
6	0	01	00	

Note 2: If the data is "01", adjustment has errors or the mechanism deck is defective.

2. Switching Position Adjustment
(VC-376 board (Non MS model))
(VC-377 board (MS model))

RadarW

Mode	VTR playback (PLAY/EDIT mode)
Signal	SW/OL standard (XH2-3)
Measurement Point	Displayed data of page: 3, address: 03
Measuring Instrument	Adjusting remote commander
Adjustment Page	C
Adjustment Address	10, 11, 12, 13
Specified value	The data of page: 3, address: 03 is "00"

Note 1: Check that the data of page: 0, address: 10 is "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1				Insert the SW/OL standard tape and enter the VTR stop mode.
2	0	01	01	
3	C	10	EE	Press PAUSE button.
4	3	21		Check the data is "02". (Note 2)
5	3	01	0D	Press PAUSE button.
6	3	02		Check the data changes to "00".
7	3	03		Check the data is "00". (Note 3)
8	0	01	00	

Note 2: If the data is "72", the tape top being played. After playing the tape for 1 to 2 seconds, stop it, perform step 5 and higher.
If the data is "62", the tape end being played. After rewind the tape, perform step 5 and higher.

Note 3: If bit0 of the data is "1", the EVEN channel is defective.
If bit1 of the data is "1", the ODD channel is defective.
Contents of the defect is see written into page: C, address: 10 and 12. See following table.
(For the bit values, refer to "6-4. SERVICE MODE", "4-3. 5. Bit value discrimination".)
If bit3 of the data is "1", the tape end being played, so rewind the tape and perform the adjustment again.

When the EVEN channel is defective

Data of page: C, address: 10	Contents of defect
EE	Writing into EEP ROM (IC8602 (Non MS model) or IC5302 (MS model)) is defective
E8	Adjustment data is out of range
E7	No data is returned from IC6001 (Non MS model) or IC4201 (MS model)

When the ODD channel is defective

Data of page: C, address: 12	Contents of defect
EE	Writing into EEP ROM (IC8602 (Non MS model) or IC5302 (MS model)) is defective
E8	Adjustment data is out of range
E7	No data is returned from IC6001 (Non MS model) or IC4201 (MS model)

Note 4: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

3. Error Rate Check
(VC-376 board (Non MS model))
(VC-377 board (MS model))

RadarW

Note: Check that the data of page: 0, address: 10 is “00”.

3-1. Preparations before adjustments

Mode	Camera recording (CAMERA mode (Non MS model)) (CAMERA-TAPE (MS model))
Subject	Arbitrary

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	01	
3	C	0D	C8	Press PAUSE button.
4	0	10	00	
5				Record the camera signal for 2 minutes.

3-2. Error Rate Check

Mode	VTR playback (PLAY/EDIT mode)
Subject	Recorded signal at “Preparations before adjustments”
Measurement Point	Displayed data of page: 3, address: 03
Measuring Instrument	Adjusting remote commander
Adjustment Page	1C
Adjustment Address	B3 to C8
Specified value	The data of page: 3, address: 03 is “00”

Note 1: If reading/writing data on pages 1C, set data: 01 to page: 0, address: 10, and then select pages: C. By this data setting, the pages 1C can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Initial Value of Page 1C: Address: B3 to C8

Address	Initial value	Address	Initial value	Address	Initial value
B3	00	BB	00	C3	80
B4	00	BC	00	C4	00
B5	00	BD	00	C5	00
B6	00	BE	00	C6	00
B7	00	BF	00	C7	00
B8	80	C0	00	C8	00
B9	00	C1	00		
BA	00	C2	00		

Table 6-3-4

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2				Check that the data of page: 1C, address: B3 to C8 is the initial value. (See Table 6-3-4)
3				Playback the recorded signal at “Preparations before adjustments”.
4	3	01	40	Press PAUSE button.
5	3	02		Check the data changes to “00”.
6	3	03		Check the data is “00”. (Note 2)
7				Perform “Processing after Completing Adjustments”.

Note 2: If the data is other than “00”, Error rate is abnormal. For the contents of the abnormality, see the following table.

Data of page: 3, address: 03	Contents of defect
01	EVEN channel is abnormal.
02	ODD channel is abnormal.
03	EVEN channel and ODD channel are abnormal.

Note 3: If Error rate is abnormal, Check the use tape, clean the tape running surface. And after inputting initial values to page 1C: address: B3 to C8, perform re-adjustment. (See Table 6-3-4)

Processing after Completing Adjustment:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	0	10	01	
3	C	0D	00	Press PAUSE button.
4	0	10	00	
5	0	01	00	

3-4. VIDEO SYSTEM ADJUSTMENTS

Before perform the video system adjustments, check that the specified values of "36 MHz Origin Oscillation Adjustment" of "1-3. CAMERA SYSTEM ADJUSTMENTS" is satisfied.
Check that the data of page: 0, address: 10 is "00".
If not, select page: 0, address: 10, and set the data "00".

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

Adjusting Procedure:

1. S VIDEO OUT Y level adjustment
2. S VIDEO OUT chroma level adjustment
3. VIDEO OUT level check

1. S VIDEO OUT Y Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

Mode	CAMERA (Non MS model) CAMERA-TAPE (MS model)
Subject	Arbitrary
Measurement Point	Y signal terminal of S VIDEO plug of A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope
Adjustment Page	C
Adjustment Address	25
Specified value	A = 1000 ± 14 mVp-p

Note 1: Check that the data of page: 0, address: 10 is "00".

Switch setting:

1) DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	8	A0		(Non MS model only) Set the bit value of bit3 is "1", and press PAUSE button. (Note 2)
		4C		(MS model only) Set the bit value of bit1 is "0", and press PAUSE button.(Note 2)
3	3	0C	02	Press PAUSE button.
4	C	25		Change the data and set the Y signal level (A) to the specified value.
5	C	25		Press PAUSE button.
6	3	0C	00	Press PAUSE button.
7	8	A0		(Non MS model only) Set the bit value of bit3 is "0", and press PAUSE button. (Note 2) (MS model only)
		4C		Set the bit value of bit1 is "1", and press PAUSE button.(Note 2)
8	0	01	00	

Note 2: For the bit values, refer to "6-4. SERVICE MODE", "4-3. 5. Bit value discrimination".

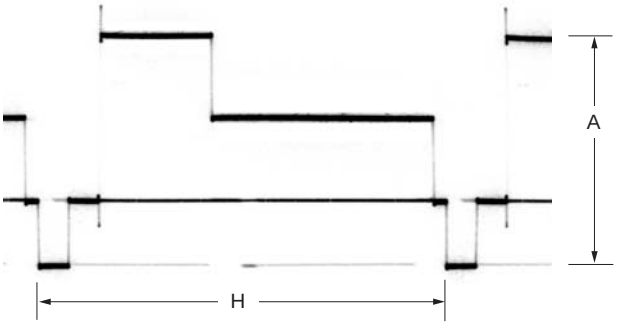


Fig. 6-3-5

2. S VIDEO OUT Chroma Level Adjustment (VC-376 board (Non MS model)) (VC-377 board (MS model))

Mode	CAMERA (Non MS model) CAMERA-TAPE (MS model)
Subject	Arbitrary
Measurement Point	Chroma signal terminal of S VIDEO plug of A/V jack (75 Ω terminated) External trigger: Y signal terminal of S VIDEO plug of A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope
Adjustment Page	C
Adjustment Address	26, 27
Specified value	Cr level: A = 714 ± 14 mVp-p (NTSC) A = 700 ± 14 mVp-p (PAL) Cb level: B = 714 ± 14 mVp-p (NTSC) B = 700 ± 14 mVp-p (PAL) Burst level: C = 286 ± 6 mVp-p (NTSC) C = 300 ± 6 mVp-p (PAL)

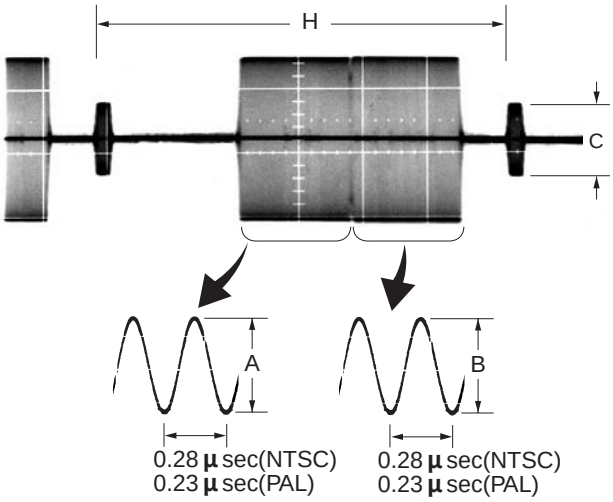


Fig. 6-3-6

Note 1: Check that the data of page: 0, address: 10 is "00".

Switch setting:

1) DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	8	A0		(Non MS model only) Set the bit value of bit3 is "1", and press PAUSE button. (Note 2)
		4C		(MS model only) Set the bit value of bit1 is "0", and press PAUSE button. (Note 2)
3	3	0C	02	Press PAUSE button.
4	C	26		Change the data and set the Cr signal level (A) to the specified value.
5	C	26		Press PAUSE button.
6	C	27		Change the data and set the Cb signal level (B) to the specified value.
7	C	27		Press PAUSE button.
8				Check the burst signal (C) to the specified value.
9	3	0C	00	
10	8	A0		(Non MS model only) Set the bit value of bit3 is "0", and press PAUSE button. (Note 2)
		4C		(MS model only) Set the bit value of bit1 is "1", and press PAUSE button. (Note 2)
11	0	01	00	

Note 2: For the bit values, refer to "6-4. SERVICE MODE", "4-3. 3. Bit value discrimination".

3. VIDEO OUT Level Check (VC-376 board (Non MS model)) (VC-377 board (MS model))

Mode	CAMERA (Non MS model) CAMERA-TAPE (MS model)
Subject	Arbitrary
Measurement Point	Video terminal of A/V jack (75 Ω terminated)
Measuring Instrument	Oscilloscope
Specified value	Sync level: A = 286 ± 18 mVp-p (NTSC) A = 300 ± 18 mVp-p (PAL) Burst level: B = 286 ± 18 mVp-p (NTSC) B = 300 ± 18 mVp-p (PAL)

Note: Check that the data of page: 0, address: 10 is "00".

Switch setting:

1) DEMO MODE (Menu setting) ..... OFF

Checking method:

Order	Page	Address	Data	Procedure
1	3	0C	02	Press PAUSE button.
2				Check the sync signal level (A) to the specified value.
3				Check the burst signal level (B) to the specified value.
4	3	0C	00	Press PAUSE button.

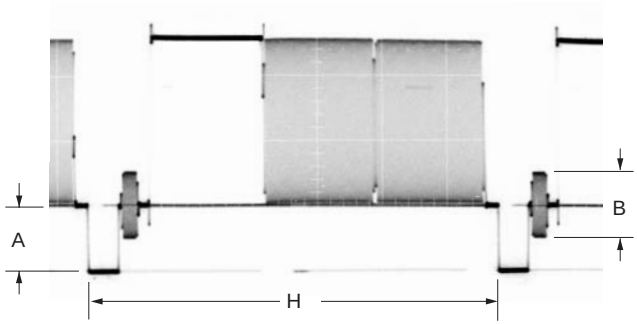


Fig. 6-3-7

3-5. AUDIO SYSTEM ADJUSTMENTS (Non MS model)

Note : Non MS model: DCR-HC17E/HC19E/HC21/HC21E/HC22E

[Connecting the measuring instruments for the audio]
Connect the audio system measuring instruments in addition to the video system measuring instruments as shown in Fig. 6-3-8.

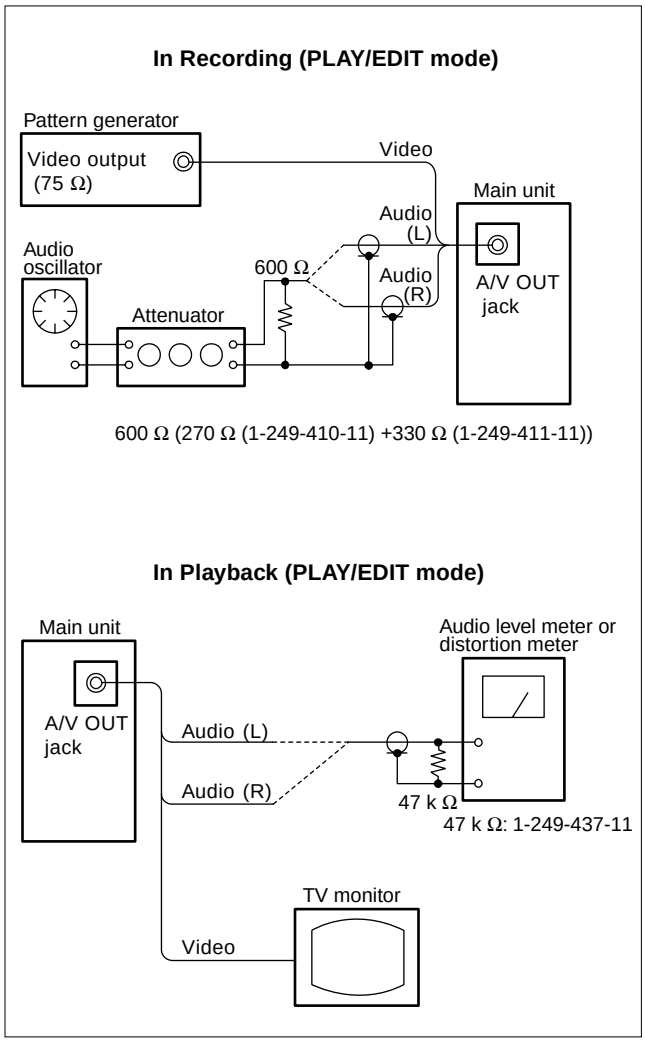


Fig. 6-3-8

1. Playback Level Check

Mode	Playback (PLAY/EDIT mode)
Signal	Alignment tape: For audio operation check (XH5-3 (NTSC)) (XH5-3P (PAL))
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter and frequency counter
Specified Value	32 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 48 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 44.1 kHz mode: The 7.35 kHz signal level during EMP OFF is +2.0 ± 2.0 dBs. The 7.35 kHz signal level during EMP ON is –6 ± 2 dB from the signal level during EMP OFF.

Note : NTSC model: DCR-HC21
PAL model: DCR-HC17E/HC19E/HC21E/HC22E

Checking Method:
1) Check that the playback signal level is the specified value.

2. Overall Level Characteristics Check

Mode	Recording and playback (PLAY/EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V OUT jack
Measurement Point	Audio left or right terminal of A/V OUT jack
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 3.0 dBs

Checking Method:
1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V OUT jack.
3) Record the signal.
4) Remove the input signal.
5) Playback the recorded section.
6) Check that the 400 Hz signal level is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

3. Overall Distortion Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V OUT jack
Measurement Point	Audio left or right terminal of A/V OUT jack
Measuring Instrument	Audio distortion meter
Specified Value	Below 0.4% (200 Hz to 6 kHz BPF ON)

Checking Method:

1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V OUT jack.
3) Record the signal.
4) Remove the input signal.
5) Playback the recorded section.
6) Check that the distortion is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

4. Overall Noise Level Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	No signal: Audio left and right terminal of A/V OUT jack
Measurement Point	Audio left or right terminal of A/V OUT jack
Measuring Instrument	Audio level meter
Specified Value	Below –45 dBs (IHF-A filter ON, 20 kHz LPF ON)

Checking Method:

1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Connect the audio left terminal of A/V OUT jack to GND using a jumper wire.
   Connect the audio right terminal of A/V OUT jack to GND using a jumper wire.
3) Record the signal.
4) Remove the jumper wires.
5) Playback the recorded section.
6) Check that the noise level is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

5. Overall Separation Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio <right> [left] terminal of A/V OUT jack No signal: Audio <left> [right] terminal of A/V OUT jack
Measurement Point	Audio <left> [right] terminal of A/V OUT jack
Measuring Instrument	Audio level meter
Specified Value	Below –40 dBs

< > : Left channel check
[ ] : Right channel check

Checking Method:

1) Select page: 7, address: 05, and set the bit value of bit 7 to "1".
2) Input the 400 Hz, –7.5 dBs signal in the audio <right> [left] terminal of A/V OUT jack.
   Connect the audio <left> [right] terminal of A/V OUT jack to GND using a jumper wire.
3) Record the signal.
4) Remove the input signal, and remove the jumper wire.
5) Playback the recorded section.
6) Check that the signal level of the audio <left> [right] terminal is the specified value.
7) Select page: 7, address: 05, and set the bit value of bit 7 to "0".

3-6. AUDIO SYSTEM ADJUSTMENTS (MS model)

Note : MS model: DCR-HC32/HC32E/HC33/HC33E

[Connecting the measuring instruments for the audio]
Connect the audio system measuring instruments in addition to the video system measuring instruments as shown in Fig. 6-3-9.

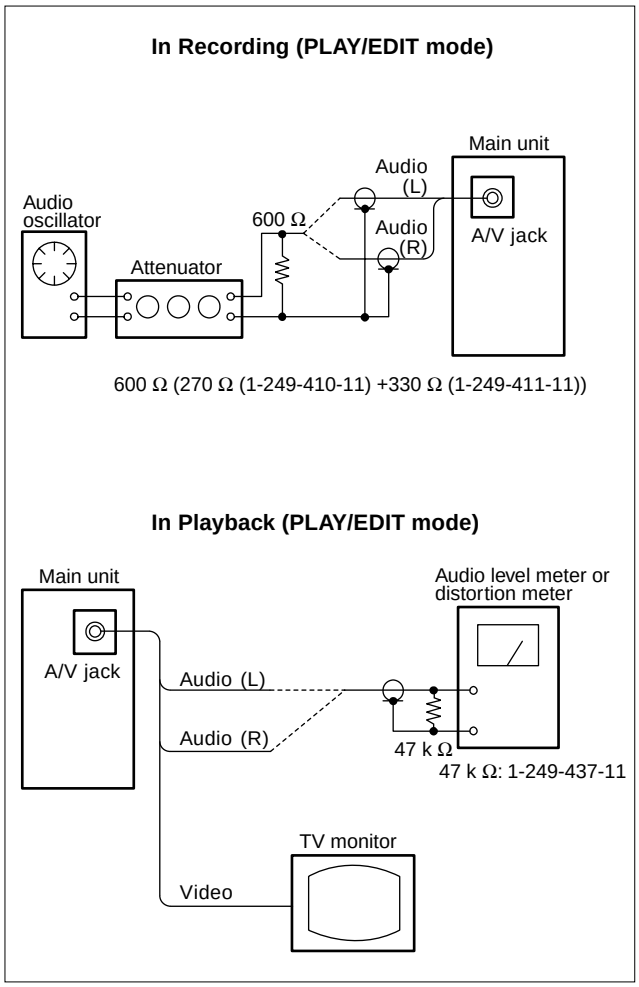


Fig. 6-3-9

1. Playback Level Check

Mode	Playback (PLAY/EDIT mode)
Signal	Alignment tape: For audio operation check (XH5-3 (NTSC)) (XH5-3P (PAL))
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter and frequency counter
Specified Value	32 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 48 kHz mode: 1 kHz, + 3.0 ± 2.0 dBs 44.1 kHz mode: The 7.35 kHz signal level during EMP OFF is +2.0 ± 2.0 dBs. The 7.35 kHz signal level during EMP ON is –6 ± 2 dB from the signal level during EMP OFF.

Note : NTSC model: DCR-HC32/HC33
PAL model: DCR-HC32E/HC33E

Checking Method:
1) Check that the playback signal level is the specified value.

2. Overall Level Characteristics Check

Mode	Recording and playback (PLAY/EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V jack
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 3.0 dBs

Checking Method:
1) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V jack.
2) Record the signal.
3) Remove the input signal.
4) Playback the recorded section.
5) Check that the 400 Hz signal level is the specified value.

3. Overall Distortion Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio left and right terminal of A/V jack
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio distortion meter
Specified Value	Below 0.4% (200 Hz to 6 kHz BPF ON)

Checking Method:

1) Input the 400 Hz, –7.5 dBs signal in the audio left and right terminal of A/V jack.
2) Record the signal.
3) Remove the input signal.
4) Playback the recorded section.
5) Check that the distortion is the specified value.

4. Overall Noise Level Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	No signal: Audio left and right terminal of A/V jack
Measurement Point	Audio left or right terminal of A/V jack
Measuring Instrument	Audio level meter
Specified Value	Below –45 dBs (IHF-A filter ON, 20 kHz LPF ON)

Checking Method:

1) Connect the audio left terminal of A/V jack to GND using a jumper wire.
   Connect the audio right terminal of A/V jack to GND using a jumper wire.
2) Record the signal.
3) Remove the jumper wires.
4) Playback the recorded section.
5) Check that the noise level is the specified value.

5. Overall Separation Check

Mode	Recording and playback (PLAY/ EDIT mode)
Signal	400 Hz, –7.5 dBs signal: Audio <right> [left] terminal of A/V jack No signal: Audio <left> [right] terminal of A/V jack
Measurement Point	Audio <left> [right] terminal of A/V jack
Measuring Instrument	Audio level meter
Specified Value	Below –40 dBs

< > : Left channel check
[ ] : Right channel check

Checking Method:

1) Input the 400 Hz, –7.5 dBs signal in the audio <right> [left] terminal of A/V jack.
   Connect the audio <left> [right] terminal of A/V jack to GND using a jumper wire.
2) Record the signal.
3) Remove the input signal, and remove the jumper wire.
4) Playback the recorded section.
5) Check that the signal level of the audio <left> [right] terminal is the specified value.

6-4. SERVICE MODE

4-1. ADJUSTMENT REMOTE COMMANDER

The adjustment remote commander is used for changing the calculation coefficient in signal processing, EVR data, etc. The adjustment remote commander performs bi-directional communication with the unit using the remote commander signal line (LANC). The resultant data of this bi-directional communication is written in the non-volatile memory.

1. Using the Adjustment Remote Commander

1) Connect the adjustment remote commander to the LANC terminal.
2) Set the HOLD switch of the adjustment remote commander to "HOLD" (SERVICE position). If it has been properly connected, the LCD on the adjustment remote commander will display as shown in Fig. 6-4-1.

Fig. 6-4-1

3) Operate the adjustment remote commander as follows.
   - Changing the page
     The page increases when the EDIT SEARCH+ button is pressed, and decreases when the EDIT SEARCH– button is pressed. There are altogether 16 pages, from 0 to F.

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
LCD Display	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal notation conversion value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

   - Changing the address
     The address increases when the FF (►►) button is pressed, and decreases when the REW (◄◄) button is pressed. There are altogether 256 addresses, from 00 to FF.
   - Changing the data (Data setting)
     The data increases when the PLAY (►) button is pressed, and decreases when the STOP (■) button is pressed. There are altogether 256 data, from 00 to FF.
   - Writing the adjustment data
     The PAUSE button must be pressed to write the adjustment data in the nonvolatile memory. (The new adjusting data will not be recorded in the nonvolatile memory if this step is not performed)
4) After completing all adjustments, turn off the main power supply (8.4 V) once.

2. Precautions Upon Using the Adjustment Remote Commander

Mishandling of the adjustment remote commander may erase the correct adjustment data at times. To prevent this, it is recommended that all adjustment data be noted down before beginning adjustments and new adjustment data after each adjustment.

4-2. DATA PROCESS

The calculation of the DDS display and the adjustment remote commander display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Indicates the hexadecimal-decimal conversion table.

Hexadecimal-decimal Conversion Table

② (Lower digit of hexadecimal)

① Upper digit of hexadecimal	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	77	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
B (b)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: The characters shown in the parenthesis ( ) shown the display on the adjustment remote commander.

(Example) If the DDS display or the adjustment remote commander shows BD (bd);
Because the upper digit of the adjustment number is B (b), and the lower digit is D (d), the meeting point "189" of ① and ② in the above table is the corresponding decimal number.

Table 6-4-1

4-3. SERVICE MODE

Note 1: Before performing the adjustment, check the data of page: 0, address: 10 is “00”. If not, select page: 0, ad dress: 00, and set data “00”.

Note 2: Non MS model: DCR-HC17E/HC19E/HC21/HC21E/ HC22E
MS model: DCR-HC32/HC32E/HC33/HC33E

1. Setting the Test Mode

1-1. Setting the Test Mode (Non MS model)

Page D	Address 10

Data	Function
00	Normal
01	Forced camera power ON (CAMERA mode)
02	Forced VTR power ON (PLAY/EDIT mode)
03	Forced camera + VTR power ON

1-2. Setting the Test Mode (MS model)

Page A	Address 10

Data	Function
00	Normal
01	Forced camera power ON (CAMERA-TAPE mode)
02	Forced VTR power ON (PLAY/EDIT mode)
03	Forced camera + VTR power ON
05	Forced memory power ON (CAMERA-MEMORY mode)

- Before setting the data , select page: 0, address: 01, and set data: 01.
- For page A, the data set will be recorded in the non-volatile memory by pressing the PAUSE button of the adjustment re- mote commander. In this case, take note that the test mode will not be exited even when the main power is turned off (8.4 Vdc).
- After completing adjustments/repairs, be sure to return the data of this address to 00, and press the PAUSE button of the adjust- ment remote commander. And select page: 0, address: 01, and set data: 00.

2. Emergence Memory Address (Non MS model)

2-1. Emergency Memory Address (Camera section)

Page 1F	Address 5A to 5D

Note: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages: F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to “00”.

Address	Contents
5A	EMG code when first error occurs
5B	EMG code when second error occurs
5C	EMG code when third error occurs
5D	EMG code when last error occurs

When no error occurs in this unit, data “00” is written in the above addresses (5A to 5D). when first error occurs in the unit, the data corresponding to the error is written in the first emergency ad- dress (5A). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (5B).
Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (5D).

Note: After completing adjustments, be sure to initialize the data of addresses 5A to 5D to “00”.

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	01	FD	Press PAUSE button.
3	6	02		Check the data changes to “01”.
4	6	01	00	Press PAUSE button.
5	0	01	00	

2-2. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in 1F page, addresses 5A to 5D. The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error

3. Emergence Memory Address (MS model)

3-1. Emergency Memory Address (Camera section)

Page 1F	Address 1C to 1F

Note: If reading/writing data on pages 1F, set data: 01 to page: 0, address: 10, and then select pages: F. By this data setting, the pages 1F can be selected.
After the data reading/writing finished, return the data on page: 0, address: 10 to "00".

Address	Contents
1C	EMG code when first error occurs
1D	EMG code when second error occurs
1E	EMG code when third error occurs
1F	EMG code when last error occurs

When no error occurs in this unit, data "00" is written in the above addresses (1C to 1F). when first error occurs in the unit, the data corresponding to the error is written in the first emergency address (1C). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (1D).
Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (1F).

Note: After completing adjustments, be sure to initialize the data of addresses 1C to 1F to "00".

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	6	01	FD	Press PAUSE button.
3	6	02		Check the data changes to "01".
4	6	01	00	Press PAUSE button.
5	0	01	00	

3-2. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in 1F page, addresses 1C to 1F. The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error

4. Emergence Memory Address (Mechanism section)

Page C	Address F4 to FF

Address	Contents
F4	EMG code when first error occurs
F6	Upper: MSW code when shift starts when first error occurs Lower: MSW code when first error occurs
F7	Lower: MSW code to be moved when first error occurs
F8	EMG code when second error occurs
FA	Upper: MSW code when shift starts when second error occurs Lower: MSW code when second error occurs
FB	Lower: MSW code to be moved when second error occurs
FC	EMG code when last error occurs
FE	Upper: MSW code when shift starts when last error occurs Lower: MSW code when last error occurs
FF	Lower: MSW code to be moved when last error occurs

When no error occurs in this unit, data "00" is written in the above addresses (F4 to FF). when first error occurs in the unit, the data corresponding to the error is written in the first emergency address (F4 to F7). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (F8 to FB).
Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (FC to FF).

Note: After completing adjustments, be sure to initialize the data of addresses F4 to FF to "00".

Initializing method:

Order	Page	Address	Data	Procedure
1	0	01	01	
2	3	01	37	Press PAUSE button.
3	3	02		Check the data changes to "00".
4	0	01	00	

4-1. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in C page, addresses F4, F8 and FC . The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error
10	Loading motor emergency during loading
11	Loading motor emergency during unloading
22	T reel emergency during normal rotation
23	S reel emergency during normal rotation
24	T reel emergency (Short circuit between S reel terminal and T reel terminal)
30	FG emergency at the start up of the capstan
40	FG emergency at the start up of the drum
42	FG emergency during normal rotation of the drum

4-2. MSW Code

MSW when errors occur:

Information on MSW (mode SW) when errors occur

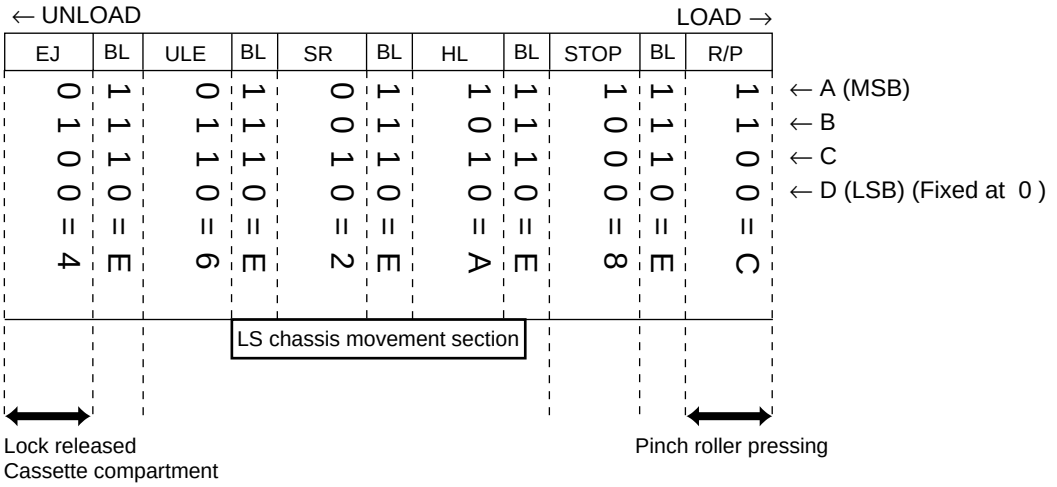
MSW when movement starts:

Information on MSW when movements starts when the mechanism position is moved (When the L motor is moved)

MSW of target of movement:

Information on target MSW of movement when the mechanism position is moved

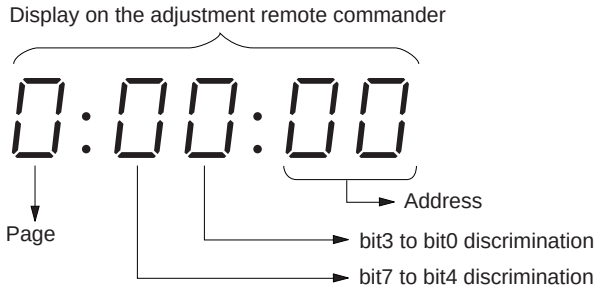
Mechanical Position



Position	Code	Contents
EJ	4	Position at which the cassette component lock is released, at the farthest unload side mechanically at which the mechanism can move no further in the UNLOAD direction.
BL	E	BLANK code, at the boundary between codes.
ULE	6	EJECT completion position. when the cassette is ejected, the mechanism will stop at this position. Cassette IN standby. The guide will start protruding out as the mechanism moves towards the LOAD position.
SR	2	Position at which it is possible to release the S ratchet.
HL	A	Guide loading are performed here.
STOP	8	Stop position in the loading state. The pinch roller separates, the tension regulator returns, and the brake is imposed on both reels.
R/P	C	PB, REC, CUE, REVIEW, PAUSE, FF, REW positions. When pinch roller is pressed, and the tension regulator is ON, the mechanism is operating at this position in modes in which normal images are shown.
NULL	0	Code not existing in the MD. Default value.
	F	Status before finding any mechanism position.

5. Bit Value Discrimination

Bit values must be discriminated using the display data of the adjustment remote commander for the following items. Us the table below to discriminate if the bit value is “1” or “0”.



(Example) If the remote commander display is “8E”, bit value from bit 7 to bit 4 can be discriminated from the column Ⓐ, and those from bit 3 to bit 0 from column Ⓑ.

	Display on the adjustment remote commander	Bit values			
		bit3 or bit7	bit2 or bit6	bit1 or bit5	bit0 or bit4
	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
Ⓐ	8	1	0	0	0
	9	1	0	0	1
	A (A)	1	0	1	0
	B (b)	1	0	1	1
	C (C)	1	1	0	0
	D (d)	1	1	0	1
Ⓑ	E (E)	1	1	1	0
	F (F)	1	1	1	1

6. Jack Check (Non MS model)

6-1. Jack Check (1) (Handycam station) (DCR-HC22E)

Page 7	Address 80

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	CRADLE MULTI jack (CR-050 board CN002)	Used	Not used

Using method:

1) Select page: 7, address: 80.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

6-2. Jack Check (2)

Page 7	Address 0C

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
2	A/V OUT jack (JK-278 board CN701)	Used	Not used
3	A/V OUT jack (JK-278 board CN701)	Used	Not used

Using method:

1) Select page: 7, address: 0C.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

7. Jack Check (MS model)

7-1. Jack Check (1) (Handycam station)

Page 7	Address FB

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	CRADLE MULTI jack (CR-050 board CN002)	Used	Not used

Using method:

1) Select page: 7, address: FB.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

7-2. Jack Check (2)

Page 7	Address F3

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	A/V jack (JK-278 board CN701)	Used	Not used

Using method:

1) Select page: 7, address: F3.
2) By discriminating the bit value of display data, the state of jack can be discriminated.

8. Switch Check (Non MS model)

8-1. Switch Check (1)

Page 2	Address 81

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	POWER (SS10300 block)	ON	OFF
1	MODE CHANGE (SS10300 block)	ON	OFF
2	DISP/BATT INFO (FP-187 fleible S001)	ON	OFF
3	EJECT (SS10300 block S001)	ON	OFF
4	CC DOWN (Mechanism chassis)	ON (DOWN)	OFF (UP)

Using method:

1) Select page: 2, address: 81.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

8-2. Switch Check (2)

Page 7	Address 08

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	Lens Cover (SI-042 board S601)	Close	Open

Using method:

1) Select page: 7, address: 08.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

8-3. Switch Check (3)

Page 7	Address 5C

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
3	REC PROOF SW (Mechanism chassis)	SAVE	REC

Using method:
1) Select page: 7, address: 5C.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

8-4. Switch Check (4)

Page 2	Address 60 to 67

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:
1) Select page: 2, address: 60 to 67.
2) By discriminating the display data, the pressed key can be discriminated.

Address	Data							
	00 to 0C	0D to 24	25 to 3F	40 to 5D	5E to 81	82 to AA	AB to D7	D8 to FF
60 (KEY AD0) (IC8001 ⑲)	START/STOP (SS10300 block) (S004)							No key input
61 (KEY AD1) (IC8001 ⑳)	2nd START/STOP (SB9000 block) (S001)	ZOOM W (SB9000 block) (S003)	ZOOM T (SB9000 block) (S002)	PANEL REVERSE (FP-186 flexble) (S101)				PANEL NORMAL (FP-186 flexble) (S101)
62 (KEY AD2) (IC8001 ㉑)	PHOTO (REC) (SS10300 block) (S002)		PHOTO (FREEZE) (SS10300 block) (S003)					No key input
63 (KEY AD3) (IC8001 ㉕)	EASY (FP-187 flexible) (S002)	BACK LIGHT (FP-187 flexible) (S003)	PANEL CLOSE (FP-187 flexible) (S004)					PANEL OPEN (FP-187 flexble) (S004)
64 (KEY AD4) (IC8001 ㉖)								
65 (KEY AD5) (IC8001 ㉗)								
66 (KEY AD6) (IC8001 ㉘)	A/V OUT jack Used (JK-278 board) (CN701)							A/V OUT jack Not used (JK-278 board) (CN701)
67 (KEY AD7) (IC8001 ㉙)								No key input

9. Switch Check (MS model)

9-1. Switch Check (1)

Page 2	Address 81

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	POWER (SS10300 block)	ON	OFF
1	MODE CHANGE (SS10300 block)	ON	OFF
3	EJECT (SS10300 block S001)	ON	OFF
4	CC DOWN (Mechanism chassis)	ON (DOWN)	OFF (UP)
5	DISP/BATT INFO (FP-187 flexible S001)	ON	OFF

Using method:

1) Select page: 2, address: 81.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

9-2. Switch Check (2)

Page 7	Address 0F

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
0	Lens cover (SI-042 board S601)	Close	Open

Using method:

1) Select page: 7, address: 0F.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

9-3. Switch Check (3)

Page 7	Address F4

Note: Check that the data of page: 0, address: 10 is “00”.

Bit	Function	When bit value = 1	When bit value = 0
4	REC PROOF SW (Mechanism chassis)	SAVE	REC

Using method:

1) Select page: 7, address: F4.
2) By discriminating the bit value of display data, the state of switch can be discriminated.

9-4. Switch Check (4)

Page 7	Address 65 to 6B

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:

1) Select page: 7, address: 65 to 6B.
2) By discriminating the display data, the pressed key can be discriminated.

Address	Data							
	00 to 0C	0D to 26	27 to 43	44 to 63	64 to 8A	8B to B6	B7 to E6	E7 to FF
65 (KEY AD0) (IC5102 ⑬⑨)	START/STOP (SS10300 block) (S004)							No key input
66 (KEY AD1) (IC5102 ⑭⓪)	2nd START/STOP (SB9000 block) (S001)	ZOOM W (SB9000 block) (S003)	ZOOM T (SB9000 block) (S002)	PANEL REVERSE (FP-186 board) (S101)				No key input
67 (KEY AD2) (IC5102 ⑭①)	PHOTO (REC) (SS10300 block) (S002)		PHOTO (FREEZE) (SS10300 block) (S003)					No key input
68 (KEY AD3) (IC5102 ⑭②)	EASY (FP-187 flexible) (S002)	BACK LIGHT (FP-187 flexible) (S003)	PANEL CLOSE (FP-187 flexible) (S004)					PANEL OPEN (FP-187 flexible) (S004)
69 (KEY AD4) (IC5102 ⑭③)								
6A (KEY AD5) (IC5102 ⑭④)								
6B (KEY AD6) (IC5102 ⑭⑤)								

10. LED, IR Light Check (Non MS model)

Page 7	Address 07	Bit5

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:
1) Set the unit to camera mode.
2) Select page: 7, address: 07, and set the bit value of bit5 to “1”.
3) Check that all LED are lit, and that the IR light is lit.
4) Select page: 7, address: 07, and set the bit value of bit5 to “0”.

11. LED, IR Light Check (MS model)

Page 7	Address 00, 01 and 04

Note: Check that the data of page: 0, address: 10 is “00”.

Using method:

Order	Page	Address	Data	Procedure
1				Set the unit to CAMERA-TAPE mode.
2	7	01	90	
3	7	04	01	
4	7	00	01	Press PAUSE button.
5				Check that the all LED are lit, and that the IR light is lit.
6	7	01	90	
7	7	04	00	
8	7	00	01	Press PAUSE button.
9	7	00	00	
10	7	01	00	

12. Record of Use Check (1)

Page 7	Address A4 to AF

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: When the drum was replaced, initialize the drum rotation counted time.
Note 3: Check that the data of page: 0, address: 10 is “00”.

Address	Function		Remarks
A4	Power supplying	Hour (H)	100000th place digit and 10000th place digit of counted time (decimal digit)
A5	time	Hour (M)	1000th place digit and 100th place digit of counted time (decimal digit)
A6		Hour (L)	10th place digit and 1st place digit of counted time (decimal digit)
A7	(BCD code)	Minute	
A8	Drum rotation	Hour (H)	100000th place digit and 10000th place digit of counted time (decimal digit)
A9	counted time	Hour (M)	1000th place digit and 100th place digit of counted time (decimal digit)
AA		Hour (L)	10th place digit and 1st place digit of counted time (decimal digit)
AB	(BCD code)	Minute	
AC	Tape run time	Hour (H)	100000th place digit and 10000th place digit of counted time (decimal digit)
AD		Hour (M)	1000th place digit and 100th place digit of counted time (decimal digit)
AE		Hour (L)	10th place digit and 1st place digit of counted time (decimal digit)
AF	(BCD code)	Minute	

Using method:

1) The record of use data is displayed at page: 7, addresses: A4 to AF.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	A4	00	Press PAUSE button.
2	7	A5	00	Press PAUSE button.
3	7	A6	00	Press PAUSE button.
4	7	A7	00	Press PAUSE button.
5	7	A8	00	Press PAUSE button.
6	7	A9	00	Press PAUSE button.
7	7	AA	00	Press PAUSE button.
8	7	AB	00	Press PAUSE button.
9	7	AC	00	Press PAUSE button.
10	7	AD	00	Press PAUSE button.
11	7	AE	00	Press PAUSE button.
12	7	AF	00	Press PAUSE button.

13. Record of Use Check (2) (Non MS model)

Page 7	Address D0 to D5

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.

Note 2: When the drum was replaced, initialize the drum rotation counted time.

Note 3: Check that the data of page: 0, address: 10 is "00".

Address	Function		Remarks
D0	Eject count without	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
D1	tape	Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
D2	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)
D3	Eject count with tape	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
D4		Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
D5	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)

Using method:

1) The record of use data is displayed at page: 7, addresses: D0 to D5.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	D0	00	Press PAUSE button.
2	7	D1	00	Press PAUSE button.
3	7	D2	00	Press PAUSE button.
4	7	D3	00	Press PAUSE button.
5	7	D4	00	Press PAUSE button.
6	7	D5	00	Press PAUSE button.

14. Record of Use Check (3) (MS model)

Page 7	Address 90 to 95

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: When the drum was replaced, initialize the drum rotation counted time.
Note 3: Check that the data of page: 0, address: 10 is “00”.

Address	Function		Remarks
90	Eject count with tape	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
91		Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
92	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)
93	Eject count without	Count (H)	100000th place digit and 10000th place digit of Eject count (decimal digit)
94	tape	Count (M)	1000th place digit and 100th place digit of Eject count (decimal digit)
95	(BCD code)	Count (L)	10th place digit and 1st place digit of Eject count (decimal digit)

Using method:
1) The record of use data is displayed at page: 7, addresses: 90 to 95.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	90	00	Press PAUSE button.
2	7	91	00	Press PAUSE button.
3	7	92	00	Press PAUSE button.
4	7	93	00	Press PAUSE button.
5	7	94	00	Press PAUSE button.
6	7	95	00	Press PAUSE button.

15. Record of Use Check (4)

Page 7	Address C8 to CD

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: Check that the data of page: 0, address 10 is “00”.

Address	Function		Remarks
C8	User initial power	Year	After setting the clock, set the date of power on next
C9	on date	Month	
CA	(BCD code)	Day	
CB	Final condensation	Year	
CC	occurrence date	Month	
CD	(BCD code)	Day	

Using method:
1) The record of use data is displayed at page: 7, addresses: C8 to CD.

16. Record of Self-diagnosis Check

Page 7	Address B0 to C6

Note 1: This data will not be erased (reset) when the lithium 3 V power supply (MS-249 board BT501) is removed.
Note 2: Check that the data of page: 0, address 10 is “00”.

Address	Self-diagnosis code
B0	“Repaired by” code (Occurred 1st time) *1
B1	“Block function” code (Occurred 1st time)
B2	“Detailed” code (Occurred 1st time)
B4	“Repaired by” code (Occurred 2nd time) *1
B5	“Block function” code (Occurred 2nd time)
B6	“Detailed” code (Occurred 2nd time)
B8	“Repaired by” code (Occurred 3rd time) *1
B9	“Block function” code (Occurred 3rd time)
BA	“Detailed” code (Occurred 3rd time)
BC	“Repaired by” code (Occurred 4th time) *1
BD	“Block function” code (Occurred 4th time)
BE	“Detailed” code (Occurred 4th time)
C0	“Repaired by” code (Occurred 5th time) *1
C1	“Block function” code (Occurred 5th time)
C2	“Detailed” code (Occurred 5th time)
C4	“Repaired by” code (Occurred the last time) *1
C5	“Block function” code (Occurred the last time)
C6	“Detailed” code (Occurred the last time)

*1 : “01” → “C”, “03” → “E”

Using method:

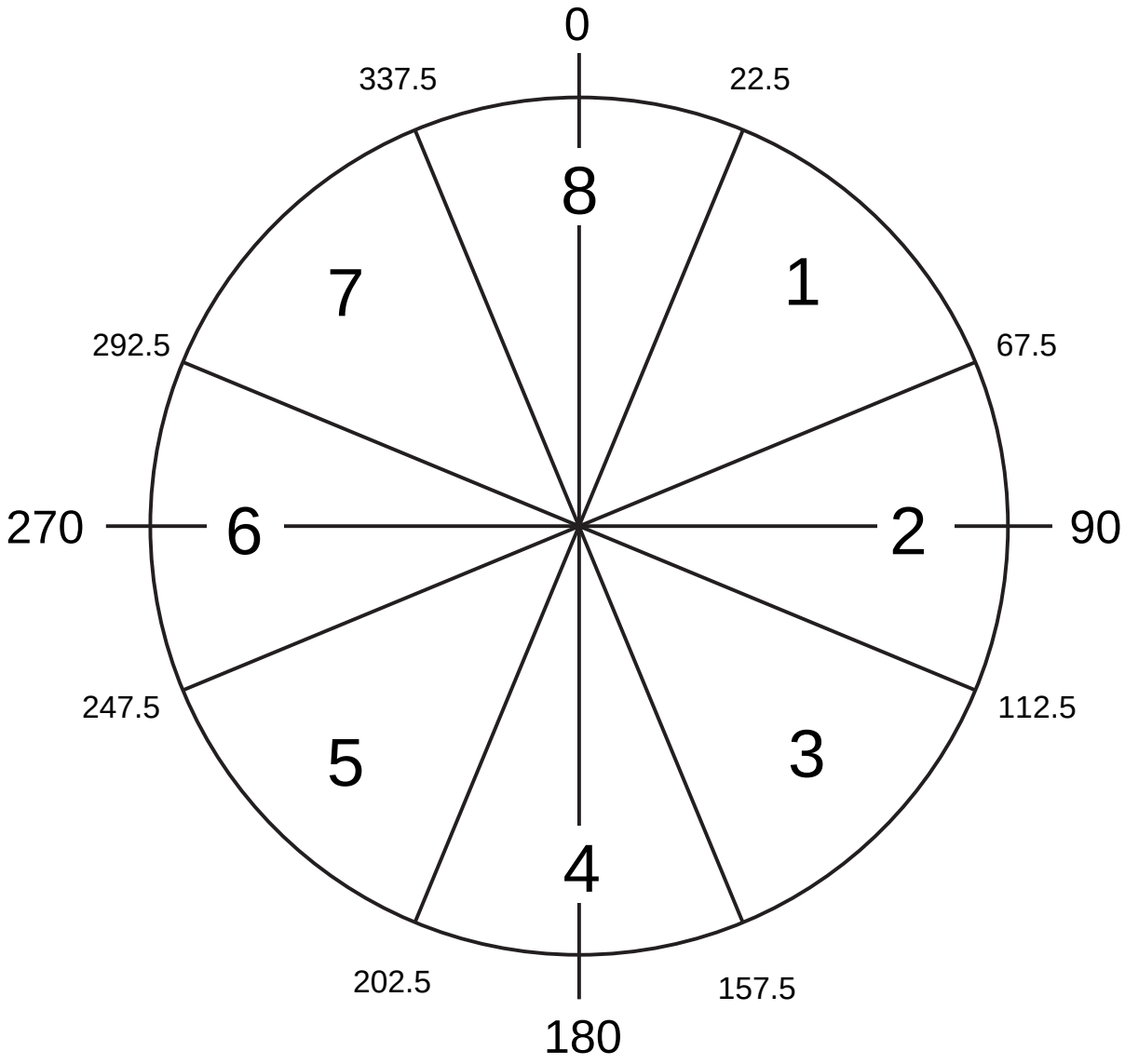
1) The past self-diagnosis codes are displayed at page: 7, address: BC to C6. Refer to “1-4. SELF-DIAGNOSIS FUNCTION” of “SERVICE MANUAL, LEVEL 2 (987678231.pdf)” for detail of the self-diagnosis code.

Initializing method:

Order	Page	Address	Data	Procedure
1	7	01	C0	
2	7	00	01	Press PAUSE button.
3	7	B0 to C6		Check that the data is “00”.
4	7	00	00	
5	7	01	00	

FOR CAMERA OPTICAL AXIS ADJUSTMENT

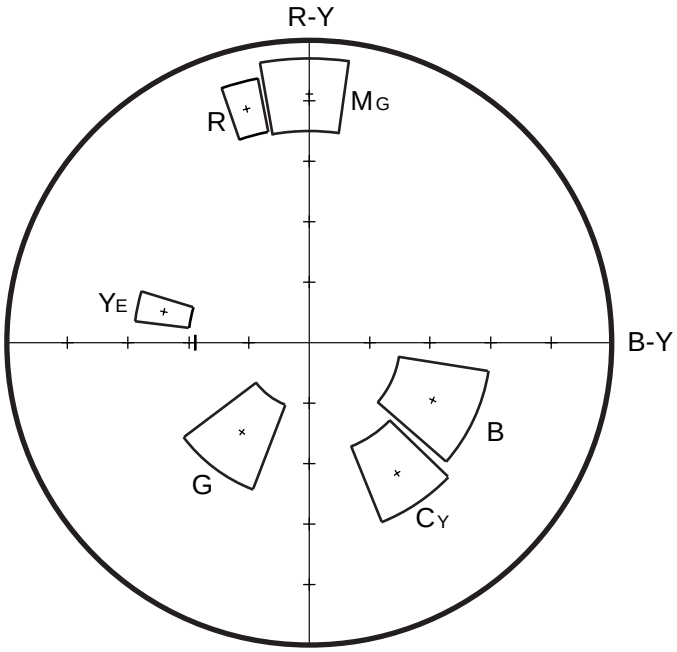
Take a copy of CAMERA OPTICAL AXIS FRAME with a clear sheet for use.



FOR CAMERA COLOR REPRODUCTION ADJUSTMENT

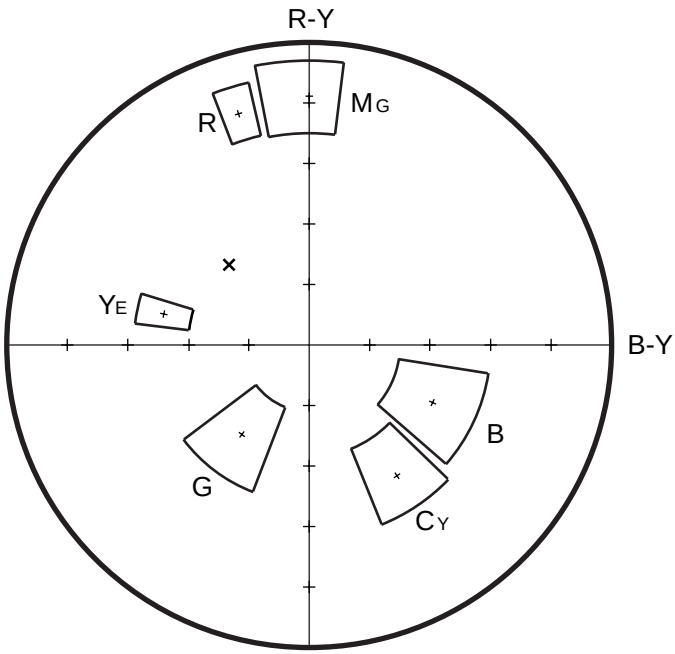
Take a copy of CAMERA COLOR REPRODUCTION FRAME with a clear sheet for use.

For NTSC model



DCR-HC21/HC32/HC33

For PAL model



DCR-HC17E/HC19E/HC21E/HC22E/
HC32E/HC33E

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2005.01	Official Release	—	—

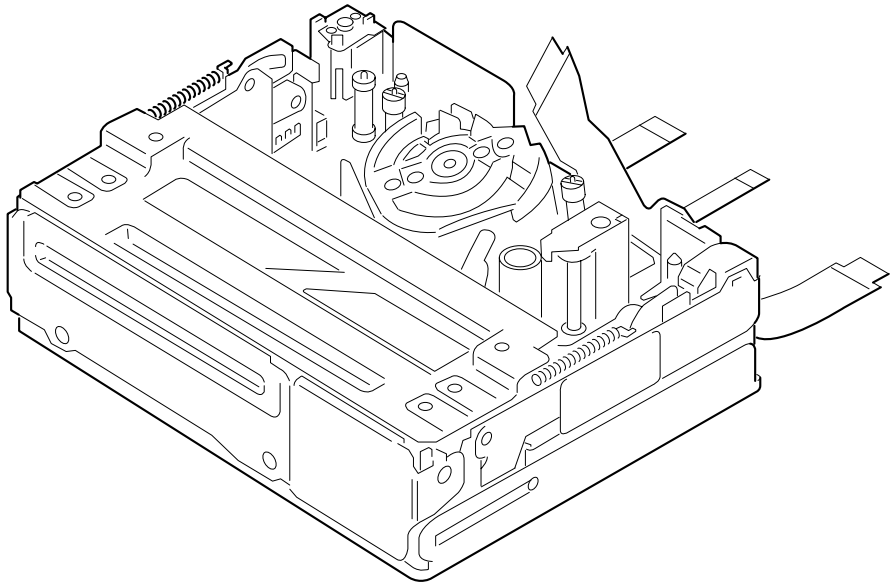
DV MECHANICAL ADJUSTMENT MANUAL VII

Ver 1.0 2003. 01

Z MECHANISM

Mini DV Digital Video Cassette

Please use this manual with the service manual of the respective models.



The capstan motor and the drum base block assy of this mechanism require very high precision work to install them in the mechanism. Therefore, the capstan motor and the drum base block assy are not supplied as the repair part independently. They are supplied as MD (Z100) SUB block assy.

Digital MECHANISM DECK

SONY

TABLE OF CONTENTS

1. Preparations for Check, Adjustment and Replacement of Mechanism Block

1-1. Cassette Compartment Assy, Damper Assy ····· 3

2. Periodic Inspection and Maintenance

2-1. Rotary Drum Cleaning ····· 4
2-2. Tape Path System Cleaning (Refer to Fig. 2-1.) ····· 4
2-3. Periodic Inspection List ····· 5
2-4. Service Jigs and Tools ····· 6
2-5. Mode Selector II Operating Procedure ····· 8
2-5-1. Introduction ····· 8
2-5-2. Operation ····· 8
2-5-3. Mechanism Status (Position) Transition Table Using Mode Selector II ····· 11
2-5-4. Battery Alarm Indication ····· 11

3. Check, Adjustment and Replacement of Mechanical Parts

3-1. Flowchart of Replacement of Mechanical Parts ····· 12
3-2. Drum ····· 13
3-3. Cassette Compartment Assy ····· 14
3-4. TG7 Support ····· 15
3-5. Motor Holder Block Assy and L Motor Block Assy ····· 16
3-6. MIC Terminal (MIC902) ····· 17
3-7. LED (D901) ····· 18
3-8. Retainer Plate ····· 19
3-9. T Reel Table Assy ····· 20
3-10. Brake (S) and Release Rack (S) ····· 21
3-11. Band Adjuster, S Reel Table Assy and TG2 Arm Block Assy ····· 22
3-12. ULE Brake Assy ····· 23
3-13. Cassette Positioning (S) ····· 24
3-14. TG7 Arm Block Assy and Pinch Arm Assy ····· 25
3-15. TG7 ····· 26
3-16. Gooseneck Gear Assy ····· 27
3-17. LS Guide Retainer and LS Cam Plate ····· 28
3-18. LS Chassis Block Assy and Mechanical Chassis Block Assy ····· 29
3-19. Brake (T) Block Assy ····· 30
3-20. END Sensor (Q901) ····· 31
3-21. TOP Sensor (Q902) ····· 32
3-22. C-IN Switch (S903), S Reel Sensor (H901) and T Reel Sensor (H902) ····· 33
3-23. Guide Rail ····· 34
3-24. Conversion Gear ····· 35
3-25. Coaster (S) Block Assy and Coaster (T) Block Assy ····· 36
3-26. TG5 Roller Assy and GL Gear (T) ····· 37
3-27. TG2 Cam Plate Assy ····· 38
3-28. LS Arm Assy ····· 39
3-29. M Slider Assy (1) ····· 40
3-30. M Slider Assy (2) ····· 41
3-31. EJ Arm ····· 42
3-32. Cam Gear and GL Driving ····· 43
3-33. Rotary Encoder (S902) ····· 44
3-34. FP-228 Flexible Board (DEW SENSOR) and FP-467 Flexible Board ····· 45

4. Adjustment

4-1. FWD Position Adjustment ····· 47
4-2. Reel Torque Check ····· 47
4-3. LS Cam Plate Position Adjustment ····· 48
4-4. Tape Path Adjustment ····· 49

5. Exploded Views

Overall Mechanism Deck Section (Z100) ····· 53
LS Chassis Block Assembly ····· 54
Mechanical Chassis Block Assembly ····· 55

6. Schematic Diagrams ····· 56

7. Printed Wiring Boards ····· 57

1. Preparations for Check, Adjustment and Replacement of Mechanism Block

- Refer to the "DISASSEMBLY" section of the SERVICE MANUAL of the respective models for details of removing cabinets and printed wiring boards.
- When making any adjustment to a mechanism or replacing mechanical parts, be sure to use the Mode Selector II and select the appropriate status of the mechanical deck such that the mechanical status is suitable for the desired work. Refer to section "2-5. Mode Selector II" for details on how to enter the mode shown in a rectangle [____] mode in subsequent paragraphs of this manual.

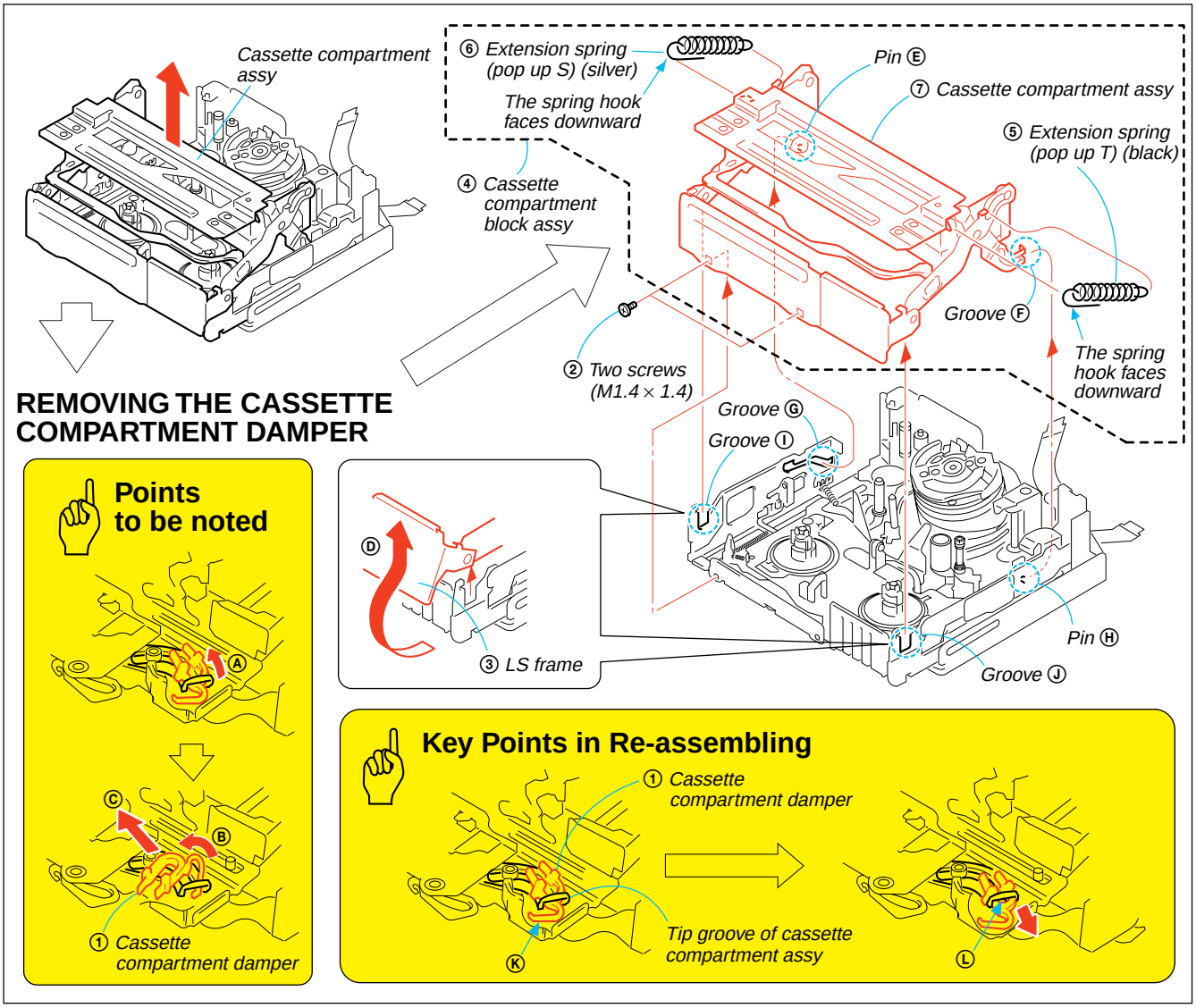
1-1. Cassette Compartment Assy, Damper Assy

1. Removal procedure

1) Set the [EJ] mode.
2) Press the cassette compartment down halfway. Pull the cassette compartment damper ① in the direction of the arrow Ⓐ. Then rotate it in the Ⓑ direction, and remove it in the direction of Ⓒ.
3) Remove the two screws (special head screw M1.4 × 1.4) ②.
4) Remove the LS chassis block assy ③ in the direction of the arrow Ⓓ.
5) Remove the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ from the LS chassis groove Ⓖ and pin Ⓗ. Then remove the cassette compartment block assy ④.
6) Remove the tension spring (POP UP T) (black) ⑤.
7) Remove the tension spring (POP UP S) (silver) ⑥.Then remove the cassette compartment assy ⑦.

2. Attachment procedure

1) Set the [ULE] mode.
2) Install the tension spring (cassette compartment S) (POP UP S) (silver) ⑥ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
3) Install the tension spring (cassette compartment T) (POP UP T) (black) ⑤ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
4) Install the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ into the LS chassis groove Ⓖ and pin Ⓗ.
5) In the status that the LS block assy ③ is kept open, insert it into the grooves Ⓘ and Ⓙ of the LS chassis block assy.
6) Close the LS chassis block assy ③ in the direction opposite to the arrow Ⓓ, and install it with the two screws (special head screw M1.4 × 1.4) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) The cassette compartment down halfway. Pass the Ⓚ portion of the cassette compartment damper ① through the groove at the tip of the cassette compartment. Then pull the Ⓛ portion and fix it using tweezers or something.



2. Periodic Inspection and Maintenance

- Be sure to perform the following maintenance and inspection so that the machine delivers its full performance and functions, and to protect the machine and tape. Also, perform the following maintenance items after completing the repair work, regardless of the number of hours the machine has been operated by the user.

2-1. Rotary Drum Cleaning

1) Press a wiping cloth (Ref. No. J-2) moistened with cleaning fluid (Ref. No. J-1) lightly against the rotary drum. Rotate the upper drum with a super-fine applicator slowly in the counter-clockwise direction to clean the rotary drum.

Caution: Never rotate the rotary drum by turning on the main power of the motor or rotate it in the clockwise direction. Never move the cloth vertically against the head tip, as this will surely damage the video head; the video head must not be cleaned by any other different methods.

2-2. Tape Path System Cleaning (Refer to Fig. 2-1.)

1) Set the EJECT state. Clean the tape running path (TG-1, -2, -3, -4, -5, -6 and -7, pinch roller and capstan shaft) and lower drum with a super-fine applicator (Ref. J-3) moistened with cleaning fluid.

Note 1: Be careful not to allow oil or grease of the various link mechanisms to get on the super-fine applicator (Ref. J-3).
Note 2: Once the super-fine applicator has been moistened with alcohol, do not use it to clean other mechanical parts such as the tape guide. However, the pinch roller is cleaned with alcohol.
Note 3: When cleaning the capstan shaft, be carefull not to move the oil seal. If the oil seal is moved, oil will leak.

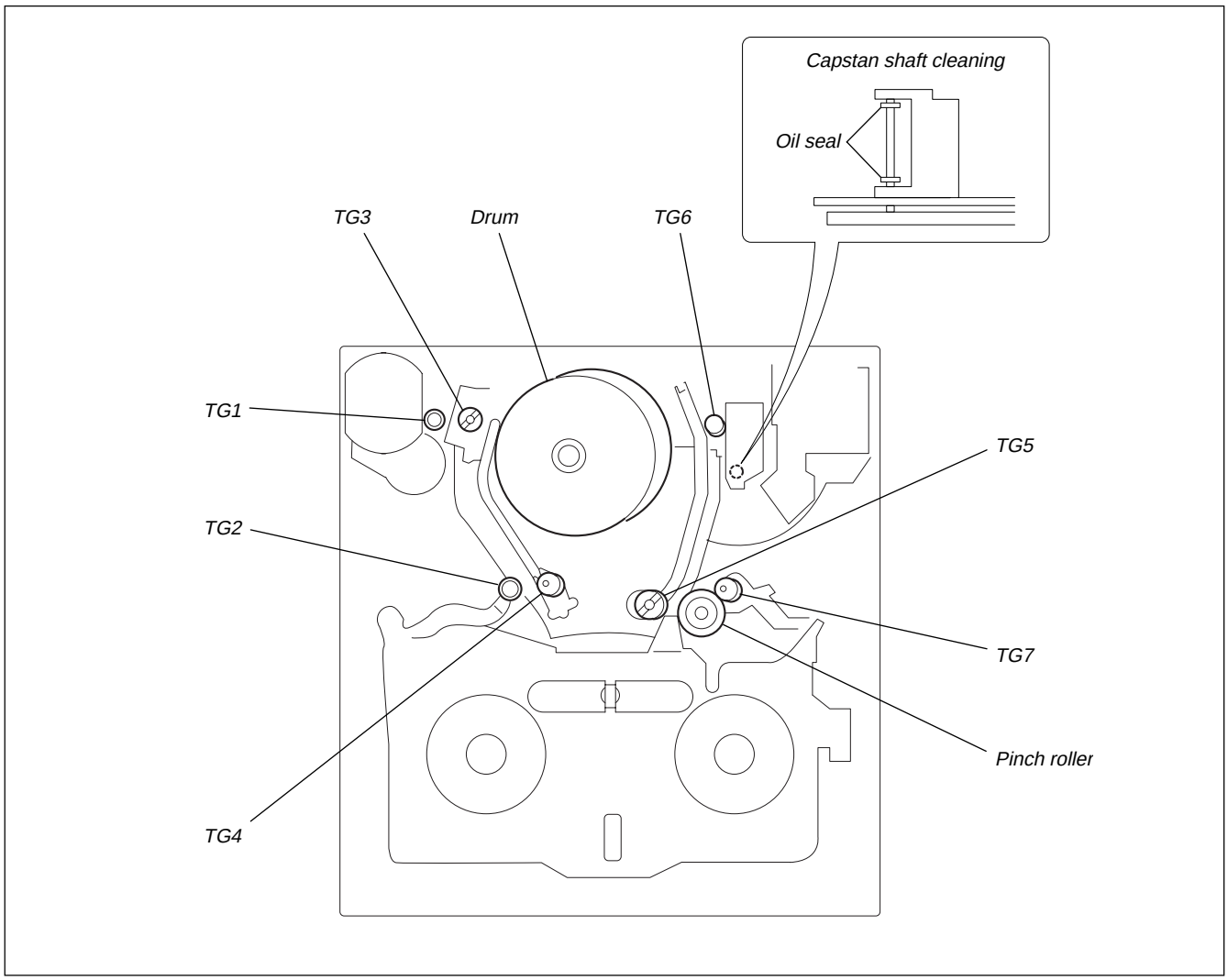


Fig. 2-1

2-3. Periodic Inspection List

Maintenance and inspection item		Operating hours (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Tape running surface cleaning	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
	Rotary drum cleaning and degaussing	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
Drive mechanism	Capstan bearing	—	☆	—	☆	—	☆	—	☆	—	☆	
Drive mechanism	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
Performance check	Back-tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	FWD/RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○: Cleaning, ☆: Check

Note 1: When the machine is overhauled, replace the parts referring to the above list.

Note 2: Grease

- Be sure to use the specified grease only. (If grease of different viscosity is used, it can cause various troubles.)
- The grease must not contain any dust or other matter. (otherwise it can cause various trouble.)
- Observe the noted amount of grease. (otherwise the oozed grease can cause troubles.)
- Suncall FG-87HSR

2-4. Service Jigs and Tools

Ref. No.	Name	Part code	Jig inscription	Used for
J-1	Cleaning fluid	Y-2031-001-0		
J-2	Wiping cloth	7-741-900-53		
J-3	Super-fine applicator (made by Nippon Applicator (P752D))	—		
J-4	Mirror (small oval type)	J-6080-840-A	GD-2038	Tape path
J-5	Tracking tape (XH2-1) (NTSC, PAL)	8-967-997-01		Tape path
J-6	Mini DV torque cassette	J-6082-360-A		
J-7	FWD/BACK T adjustment screwdriver	J-6082-187-A		For TG2 FWD position adjustment
J-8	Torque screwdriver	J-9049-330-A		
J-9	Tape path screwdriver	J-6082-026-A		For tape path adjustment
J-10	Adjustment remote commander (RM-95 upgraded)	J-6082-053-B		
J-11	Mode Selector II	J-6082-282-B		General adjustment (ROM version 1.8)
J-12	Mode Selector II conversion board (Z)	J-6082-493-A		
J-13	Mode Selector II ROM (supporting Z mechanism) * Note 1	J-6082-314-G		ROM for Mode Selector II

Other required equipment: Oscilloscope

Note 1: This is the ROM used for upgrading the version of Mode Selector II to enable it to be used for the Z mechanism.

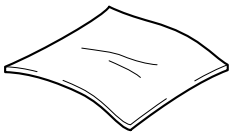
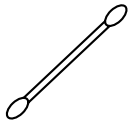
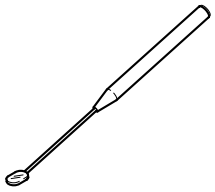
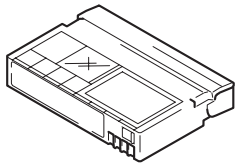
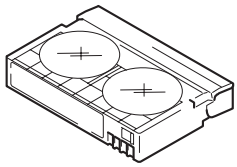
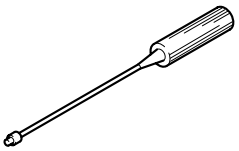
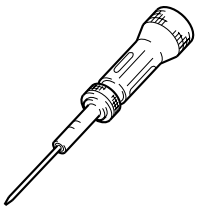
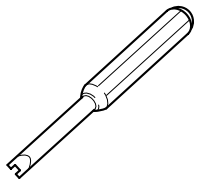
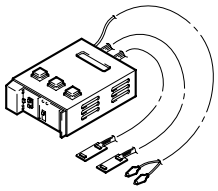
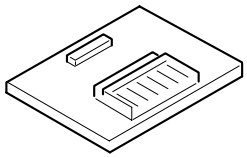
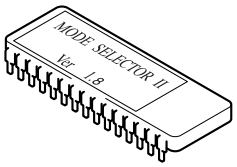
J-1	***J-2*** 	***J-3*** 	***J-4*** 	***J-5*** 
J-6 	***J-7*** 	***J-8*** 	***J-9*** 	***J-10***
J-11 	***J-12*** 	***J-13*** 		

Fig. 2-2

2-5. Mode Selector II Operating Procedure

2-5-1. Introduction

The Mode Selector II is a mechanism drive tool that assists maintenance work of the various mechanism decks. It has the following functions.

1. Manual Test

In this mode, the motor of the mechanism deck is powered only during the period while the switch is turned on manually. Using the Manual Test, the operator can freely control the motor of the mechanism deck.

2. Step Test

In this mode, the motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information. The Step Test is used to confirm a series of movements of the mechanism deck.

3. Auto Test

The Mode Selector II stores the status transition table in its memory as data indicating the respective modes of the mechanism deck. The status transition table can be used to confirm whether a mechanism deck is operating normally or has abnormality from a series of movements of a mechanism deck. If an abnormal status transition is detected during operation, the "NG" indication appears and the mechanism stops moving.

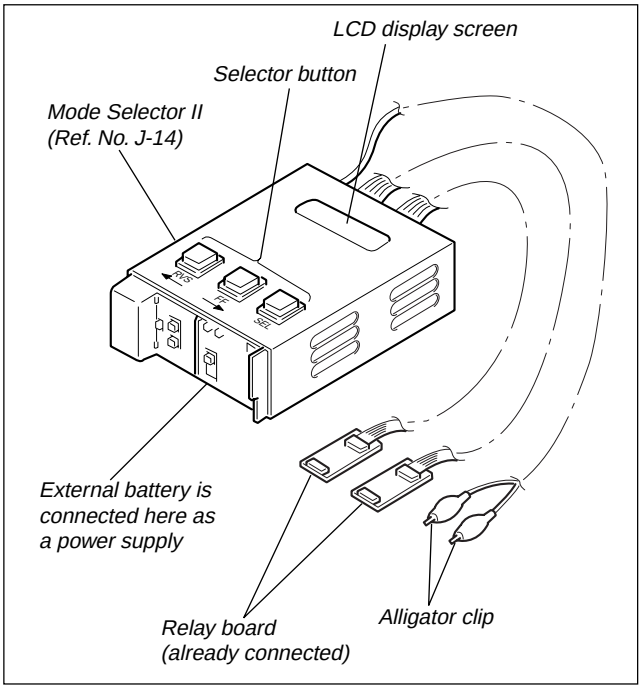


Fig. 2-3

Mode Selector II (J-6082-282-B) connection diagram

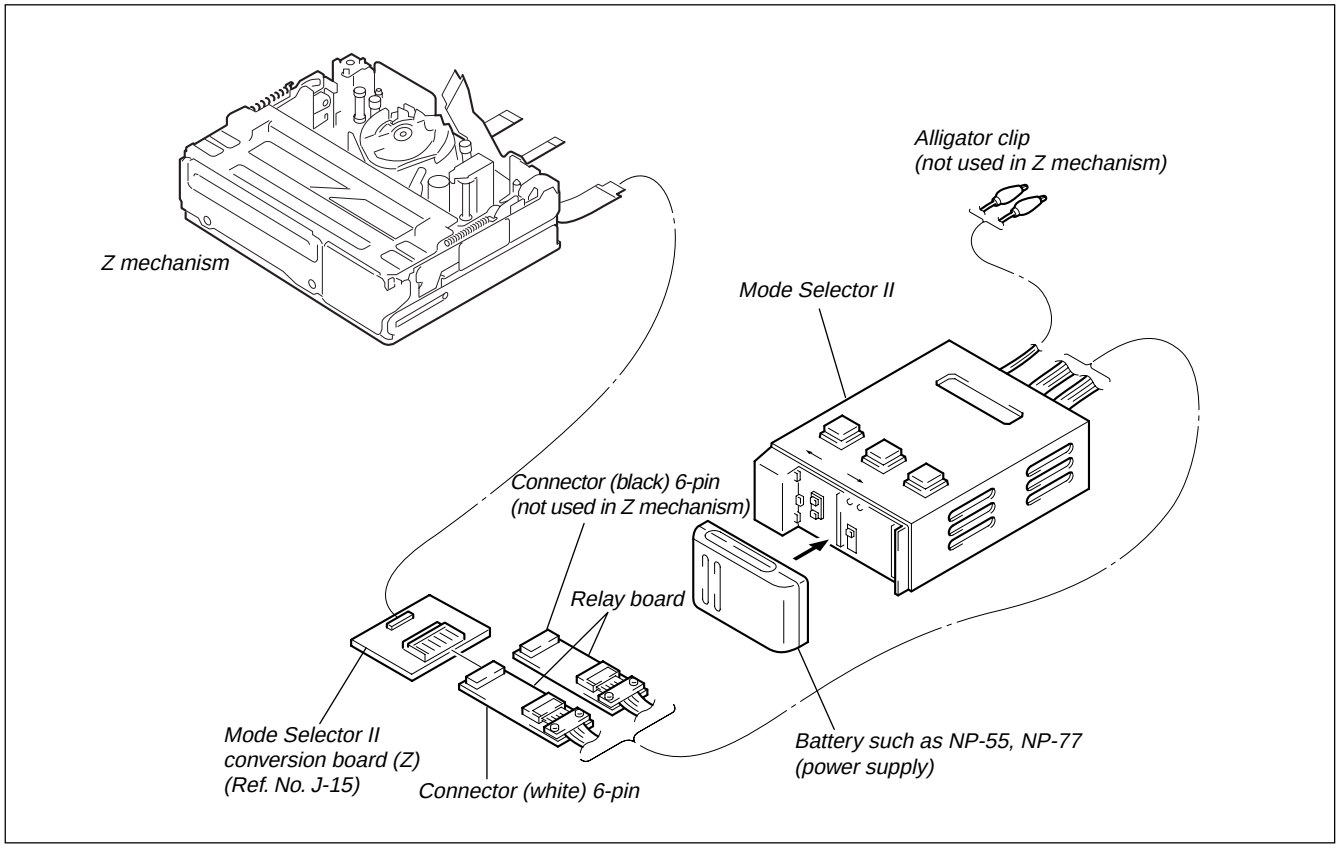
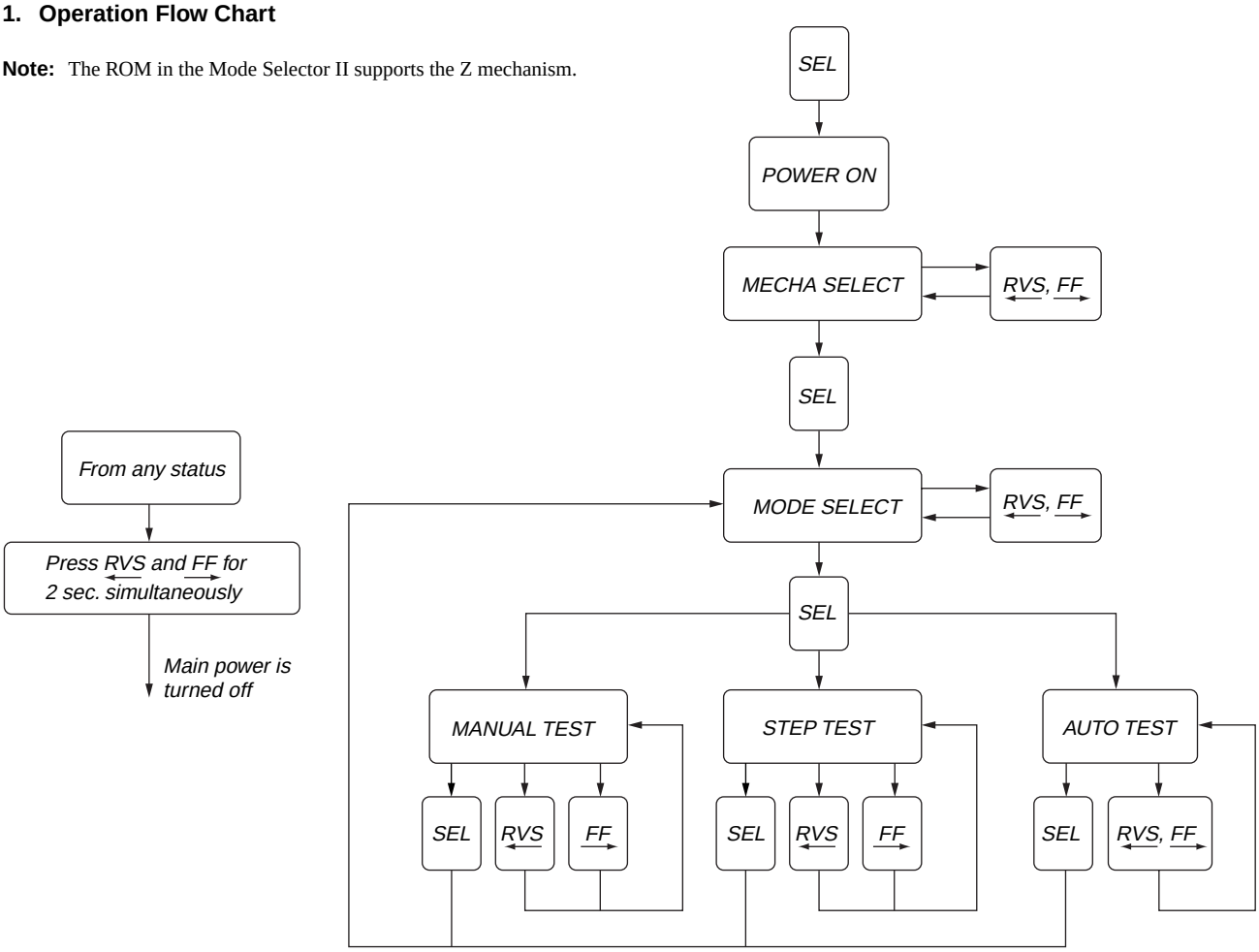


Fig. 2-4

2-5-2. Operation

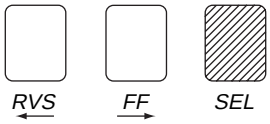
1. Operation Flow Chart

Note: The ROM in the Mode Selector II supports the Z mechanism.



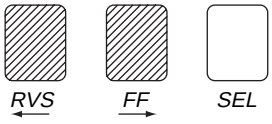
2. Mode Selector II Power On

Turn on the main power of the Mode Selector II as follows.
Press the SEL button.



3. Mode Selector II Power Off

Turn off the main power of the Mode Selector II as follows.
Press the RVS and FF buttons at the same time for 2 seconds or longer while the power is on.



4. Mecha Select

When the main power is turned on, the MECHA SELECT display appears on the LCD screen. Select the desired mechanism name using the RVS and FF buttons. Selection is complete when the SEL button is pressed. (Fig. A shows the Z mechanism.)

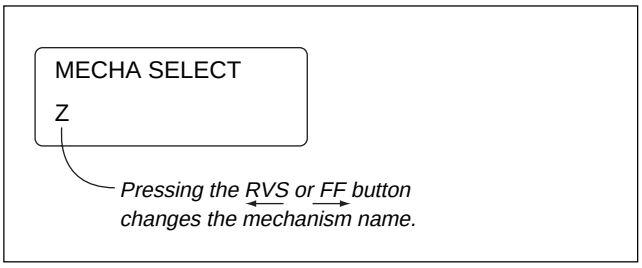


Fig. a

5. Test Type Select

Using the RVS and FF buttons, select a desired test type from the three types of "MANUAL", "STEP" and "AUTO". Selection is complete when the SEL button is pressed.

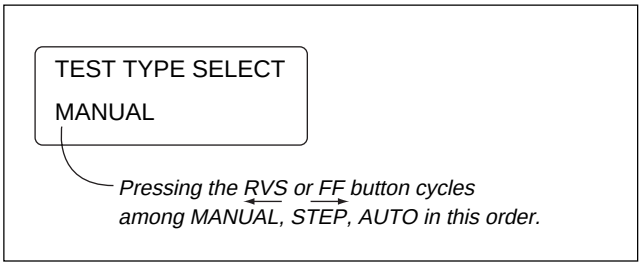


Fig. b

6. Manual Test

In this test, the motor of the mechanism deck is turned on only during the period while the RVS or FF button is pressed manually.

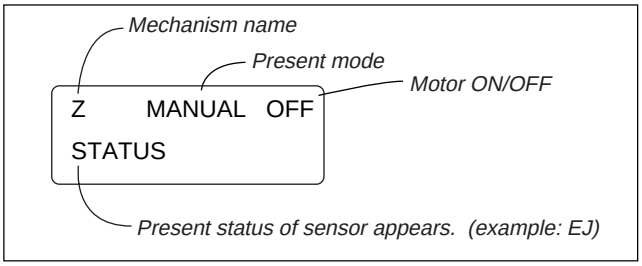


Fig. c

7. Step Test

In this test, the direction of motor movement is determined by the RVS and FF buttons. The motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information.

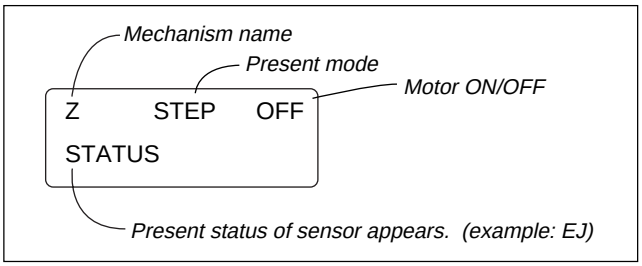


Fig. d

8. Auto Test

In this test, the mechanism deck is tested as to whether it performs a series of movements correctly in accordance with the operation sequence that is memorized earlier for each type of deck, by checking the output signals from sensors with the stored memory. Turning on the RVS or FF button performs the same operation.

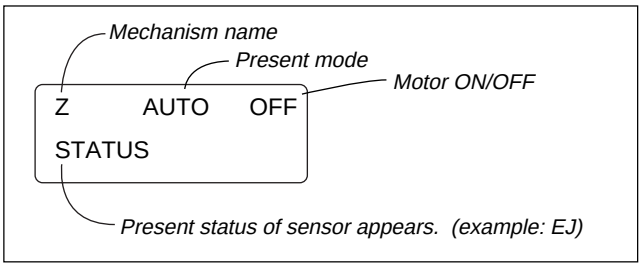


Fig. e

2-5-3. Mechanism Status (Position) Transition Table Using Mode Selector II

After selecting a mechanism deck, select either the MANUAL or STEP test (not AUTO) using the Mode Selector II. The desired mechanism status (position) can be specified by pressing the RVS or FF button. (The selected status appears on STATUS.)
EJ⟷ULE⟷SR⟷HL⟷STOP⟷R/P

MD name / Code				Z Mechanism
A	B	C		
0	1	0	1	EJ
1	1	0	2	ULE
1	0	0	3	SR
1	0	1	4	HL
0	0	1	5	STOP
0	1	1	6	R/P

2-5-4. Battery Alarm Indication

When the level of the battery used to supply power to this system decreases, this display appears asynchronously. When this happens, all operations are disabled and the battery must be replaced.

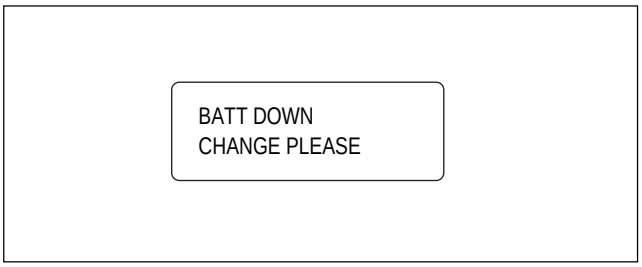
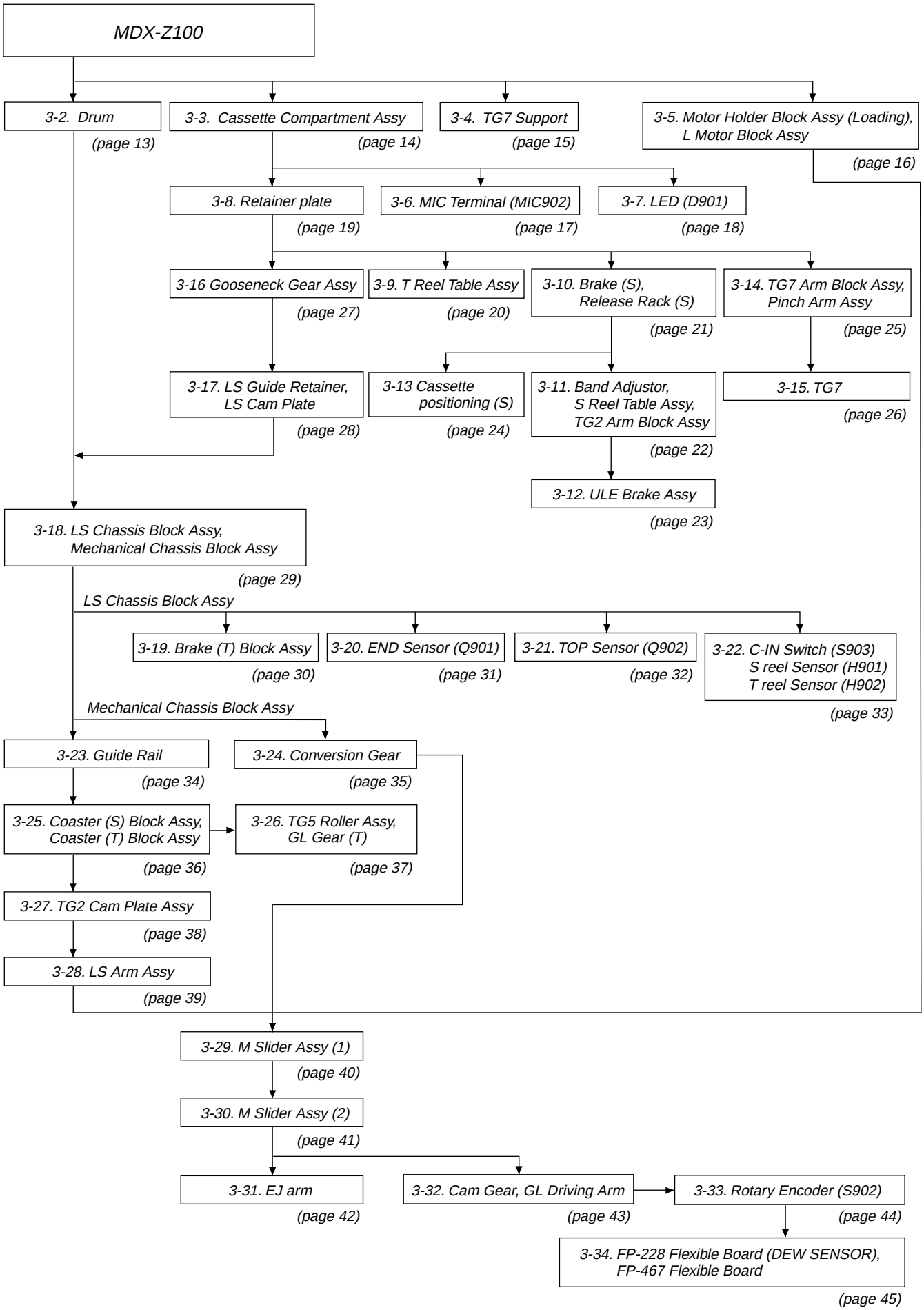


Fig. f

3. Check, Adjustment and Replacement of Mechanical Parts

3-1. Flowchart of Replacement of Mechanical Parts



3-2. Drum

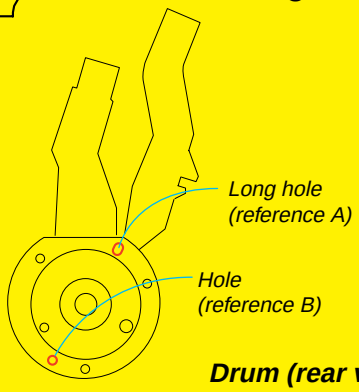
1. Removal procedure

1) Remove head drum flexible board Ⓒ from the notch of the mechanical chassis block assy.
2) Remove the drum fixing screw (M1.4 × 1.3) ① and remove the drum assy ②.

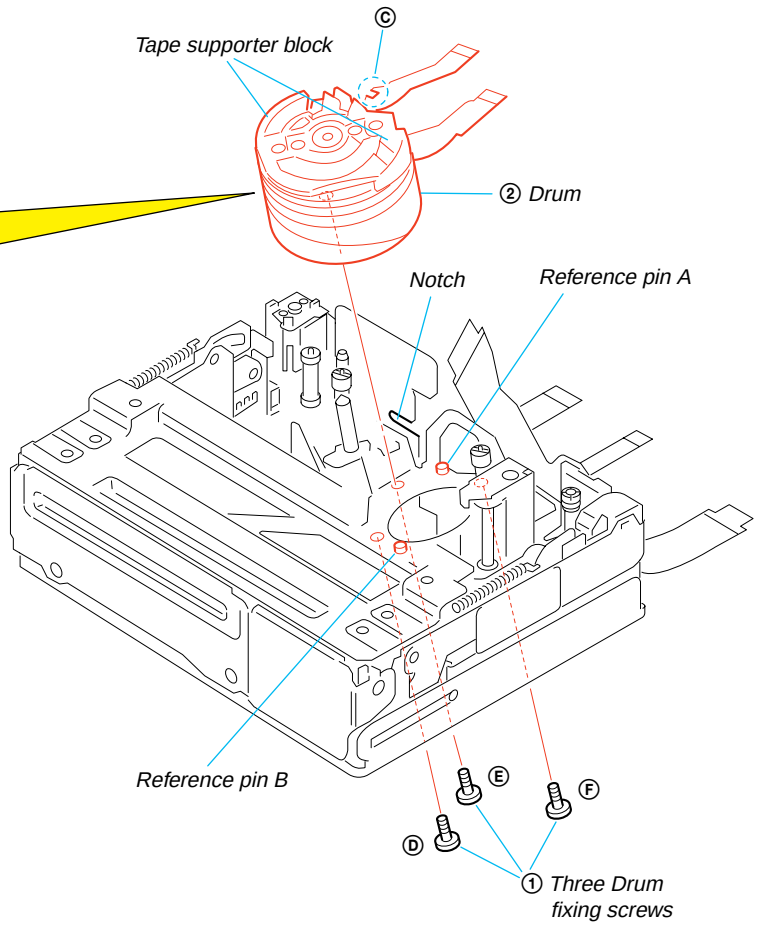
2. Attachment procedure

1) Ensure that head drum fixible board is hooked on the tape supporter block.
2) Hold the tape-supporter block of the drum ② and insert the drum flexible board into the mechanical chassis block assy.
3) Insert the two reference holes A and B of the drum into the reference pins A and B of the drum base assy.
4) Hook the flexible board Ⓒ portion on the notch.
5) Install the three drum fixing screws (M1.4 × 1.3) ① in the order starting from Ⓓ, then Ⓔ, and finally Ⓕ. Then tighten the screws.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
   Return Ⓔ 120°, then apply the screw locking paint (Neji lock).
6) Clean the drum by referring to section2-1.
7) Perform the tape path adjustment. (Refer to “4-4. Tape Path Adjustment”.)

Key Points in Re-assembling

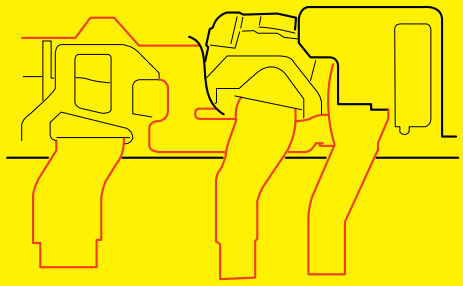


Drum (rear view)



Drum Flexible Board Processing

Key Points in Re-assembling



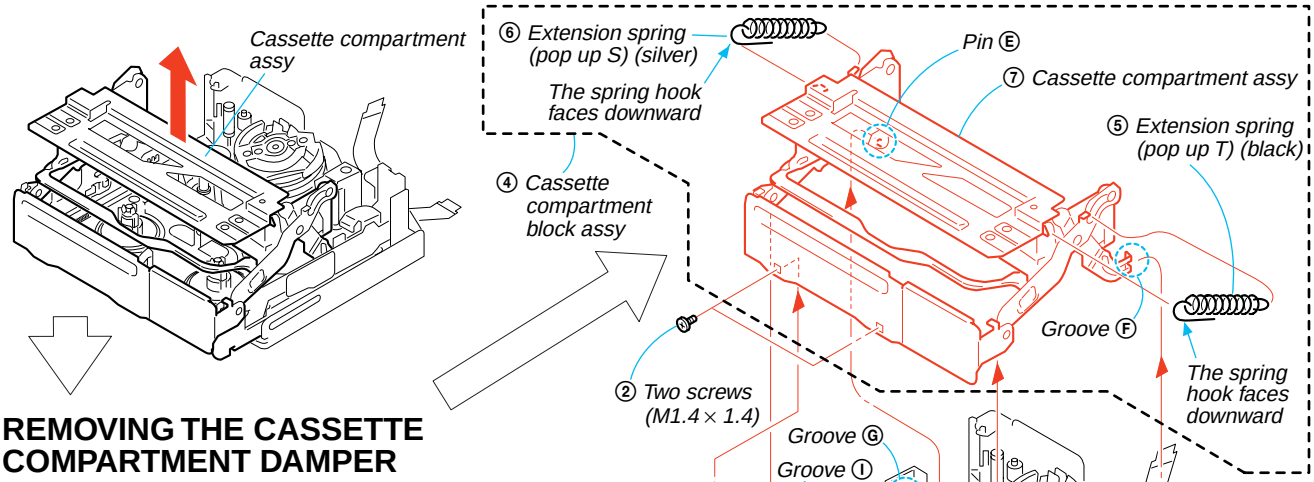
3-3. Cassette Compartment Assy

1. Removal procedure

1) Set the [EJ] mode.
2) Press the cassette compartment down halfway. Pull the cassette compartment damper ① in the direction of the arrow Ⓐ. Then rotate it in the Ⓑ direction, and remove it in the direction of Ⓒ.
3) Remove the two screws (special head screw M1.4 × 1.4) ②.
4) Remove the LS chassis block assy ③ in the direction of the arrow Ⓓ.
5) Remove the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ from the LS chassis groove Ⓖ and pin Ⓗ. Then remove the cassette compartment block assy ④.
6) Remove the tension spring (POP UP T) (black) ⑤.
7) Remove the tension spring (POP UP S) (silver) ⑥.Then remove the cassette compartment assy ⑦.

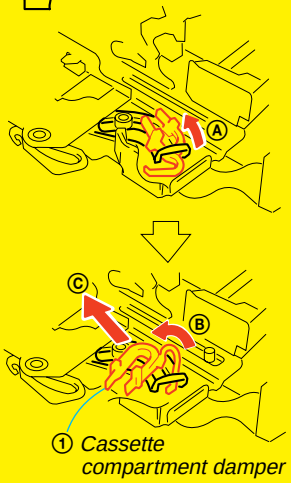
2. Attachment procedure

1) Set the [ULE] mode.
2) Install the tension spring (cassette compartment S) (POP UP S) (silver) ⑥ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
3) Install the tension spring (cassette compartment T) (POP UP T) (black) ⑤ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
4) Install the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ into the LS chassis groove Ⓖ and pin Ⓗ.
5) In the status that the LS block assy ③ is kept open, insert it into the grooves Ⓘ and Ⓙ of the LS chassis block assy.
6) Close the LS chassis block assy ③ in the direction opposite to the arrow Ⓓ, and install it with the two screws (special head screw M1.4 × 1.4) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) The cassette compartment down halfway. Pass the Ⓚ portion of the cassette compartment damper ① through the groove at the tip of the cassette compartment. Then pull the Ⓛ portion and fix it using tweezers or something.

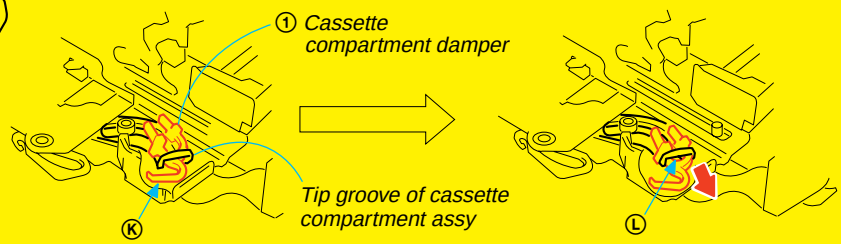


REMOVING THE CASSETTE COMPARTMENT DAMPER

Points to be noted



Key Points in Re-assembling



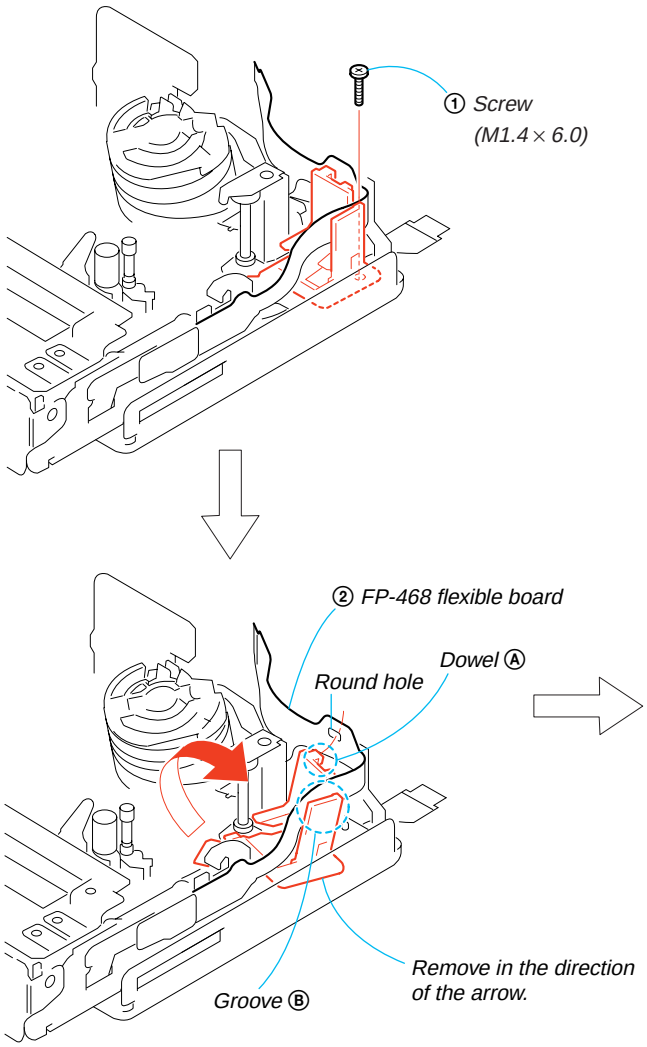
3-4. TG7 Support

1. Removal procedure

1) Remove the screw (special head screw M1.4 × 6.0) ①.
2) Remove the FP-468 flexible board ② from the dowel Ⓐ of the TG7 support.
3) Remove the FP-468 flexible board ② from the groove Ⓑ of the TG7 support.
4) Remove the TG7 support ③ in the direction of the arrow.

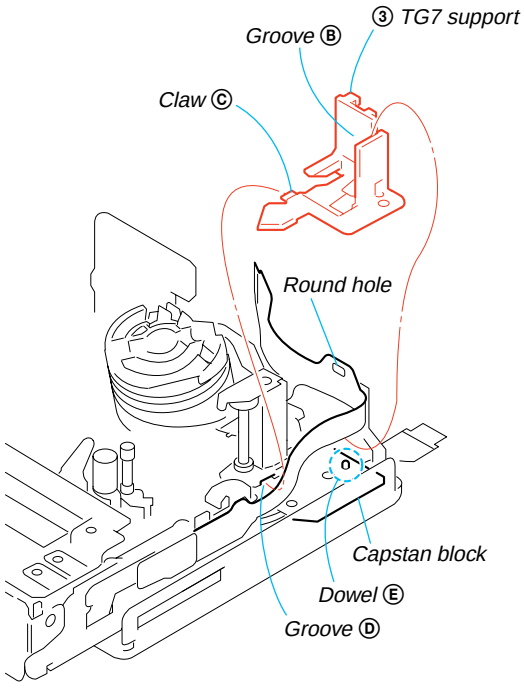
2. Attachment procedure

1) Install the FP-468 flexible board ② into the groove Ⓑ of TG7 support ③.
2) Insert the claw Ⓒ of the TG7 support ③ into the groove Ⓓ of the capstan block, and fix it while aligning with the dowel Ⓔ.
3) Align the round hole of the FP-468 flexible board ② with the dowel Ⓐ of the TG7 support ③.
4) Install the screw (special head screw M1.4 × 6.0) ①.
Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



Points to be noted

• Be careful not to damage the FP-468 flexible board.



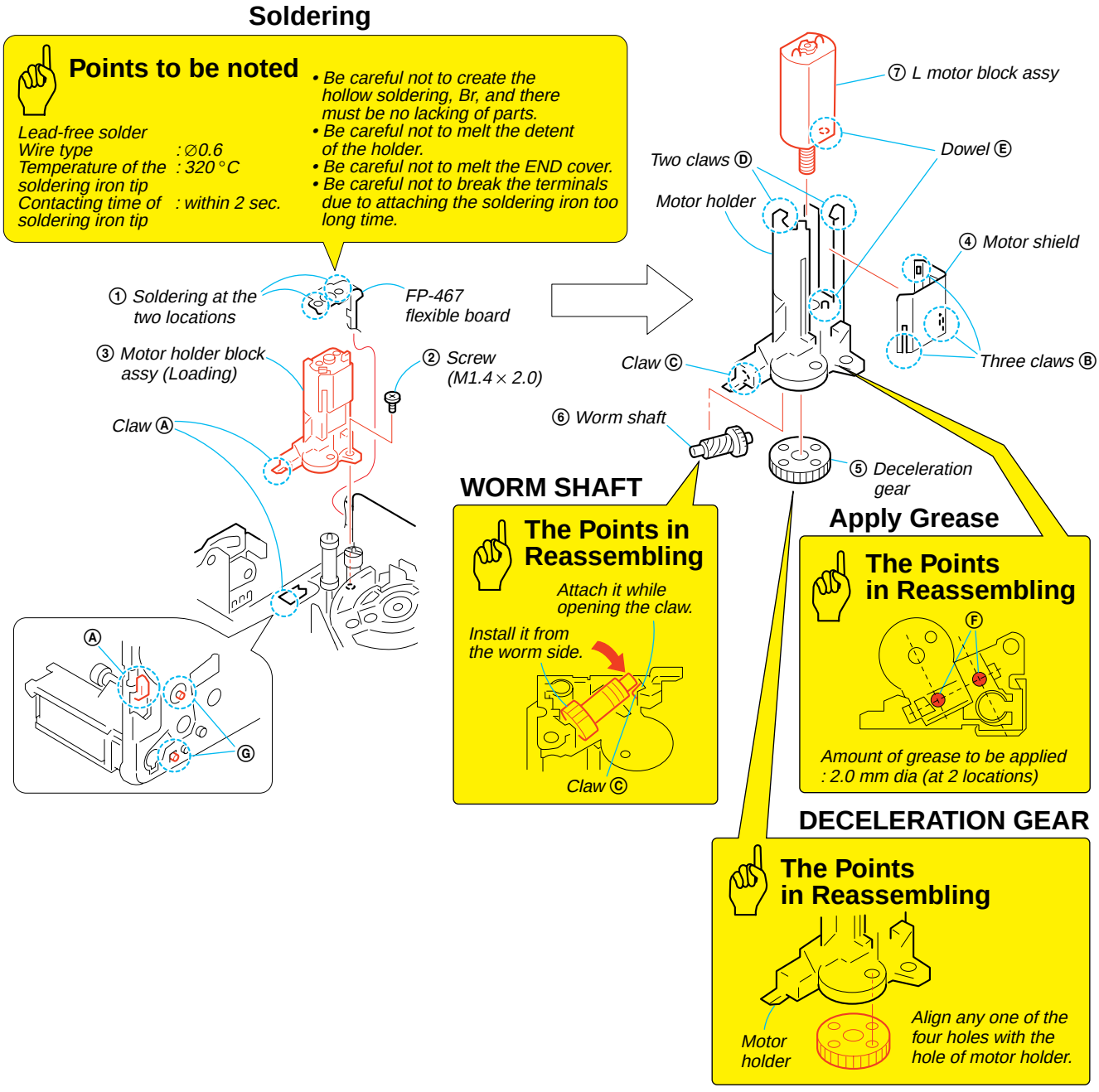
3-5. Motor Holder Block Assy and L Motor Block Assy

1. Removal procedure

1) Remove soldering at the two locations ①, and remove the FP-467 flexible board from the motor holder block assy (loading) ③.
2) Remove the screw (special head screw M1.4 × 2.0) ②.
3) Remove the motor holder block assy (loading) ③ by pulling it off from the claw Ⓐ.
4) Release the three claws Ⓑ and remove the motor shield ④.
5) Remove the deceleration gear ⑤.
6) Release the claw Ⓒ and remove the worm shaft ⑥.
7) Release the two claws Ⓓ and remove the L motor block assy ⑦ from the motor holder.

2. Attachment procedure

1) Confirm the direction of the L motor block assy ⑦. Align the dowels Ⓔ then install into the motor holder. (Insert the motor worm so that the motor worm does not touch the motor holder, and fix it with two claws Ⓓ.
2) Engage the three claws Ⓑ and install the motor shield.
3) Apply 2.0 g of grease (at 2 locations) to the bottom Ⓕ of the motor holder.
4) Install the worm shaft ⑥ from the worm side and set the claw.
5) Install the reduction gear ⑤.
6) Engage the claw Ⓐ and align the two dowels Ⓖ. Then install the motor holder block assy (loading) ③ in the mechanical chassis block. Install the screw (special head screw M1.4 × 2.0) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) Make soldering at the two locations ①. Install the motor holder block assy (loading) ③ into the FP-467 flexible board ④.


Soldering
Points to be noted
Lead-free solder
Wire type : ∅0.6
Temperature of the soldering iron tip : 320 °C
Contacting time of soldering iron tip : within 2 sec.
• Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
• Be careful not to melt the detent of the holder.
• Be careful not to melt the END cover.
• Be careful not to break the terminals due to attaching the soldering iron too long time.
① Soldering at the two locations
FP-467 flexible board
③ Motor holder block assy (Loading)
② Screw (M1.4 × 2.0)
Claw Ⓐ
Ⓐ
Ⓖ
⑦ L motor block assy
Two claws Ⓓ
Dowel Ⓔ
Motor holder
④ Motor shield
Three claws Ⓑ
Claw Ⓒ
⑥ Worm shaft
⑤ Deceleration gear
WORM SHAFT
The Points in Reassembling
Attach it while opening the claw.
Install it from the worm side.
Claw Ⓒ
Apply Grease
The Points in Reassembling
Ⓕ
Amount of grease to be applied : 2.0 mm dia (at 2 locations)
DECELERATION GEAR
The Points in Reassembling
Motor holder
Align any one of the four holes with the hole of motor holder.

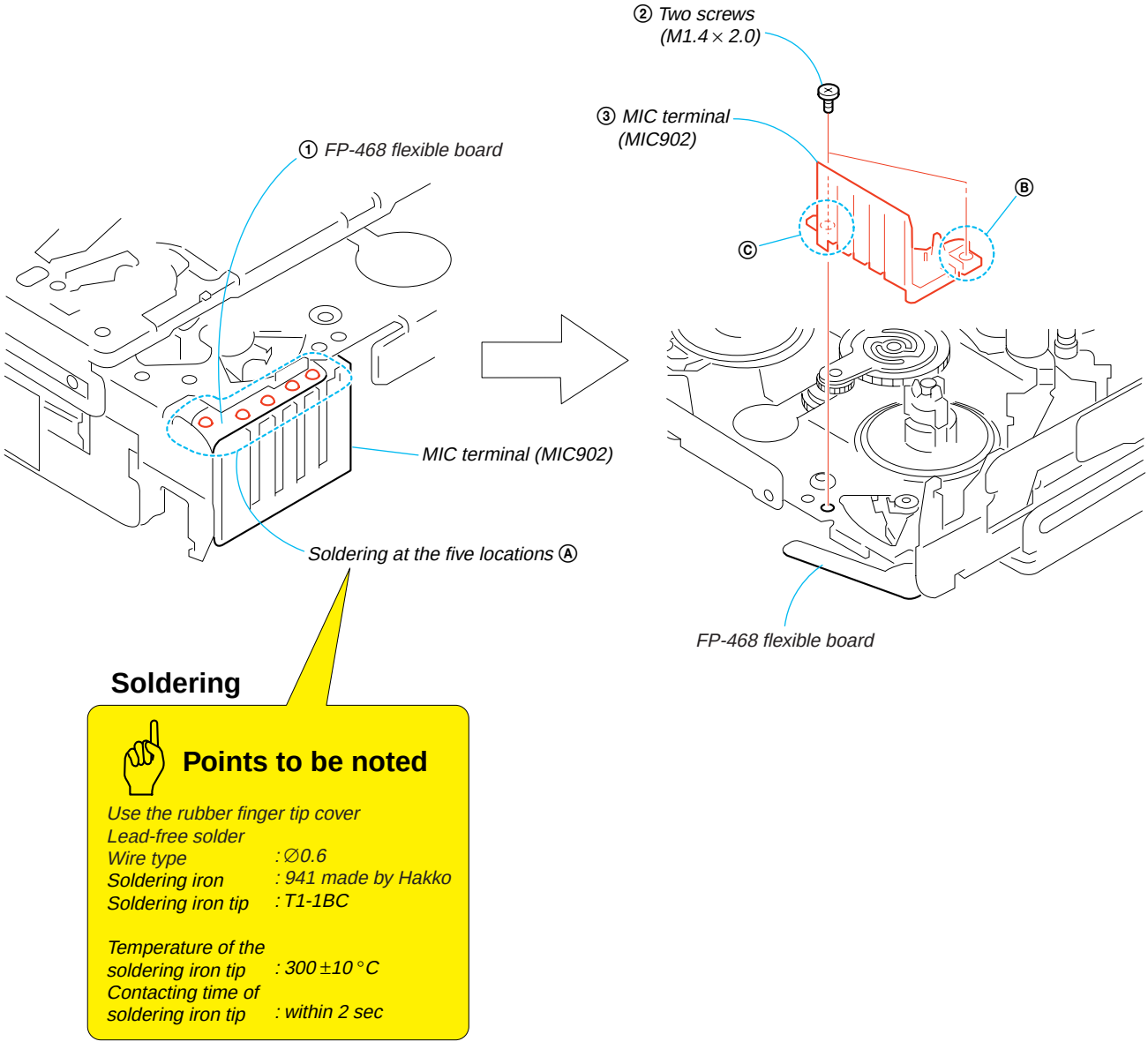
3-6. MIC Terminal (MIC902)

1. Removal procedure

1) Remove soldering at the five locations Ⓐ, and remove the FP-467 flexible board ① from the MIC terminal (MIC902) ③.
2) Remove the screw (special head screw M1.4 × 2.0) ② and remove the MIC terminal (MIC902) ③.

2. Attachment procedure

1) While pressing the top of the MIC terminal (MIC902) ③, tighten the two screws (special head screw M1.4 × 2.0) ② in the order of Ⓑ then Ⓒ.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
2) Make soldering at the five locations Ⓐ, and connect the FP-468 flexible board ① into the MIC terminal (MIC902) .



Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder

Wire type	*: ∅0.6*
Soldering iron	*: 941 made by Hakko*
Soldering iron tip	*: T1-1BC*
Temperature of the soldering iron tip	*: 300 ±10 °C*
Contacting time of soldering iron tip	*: within 2 sec*

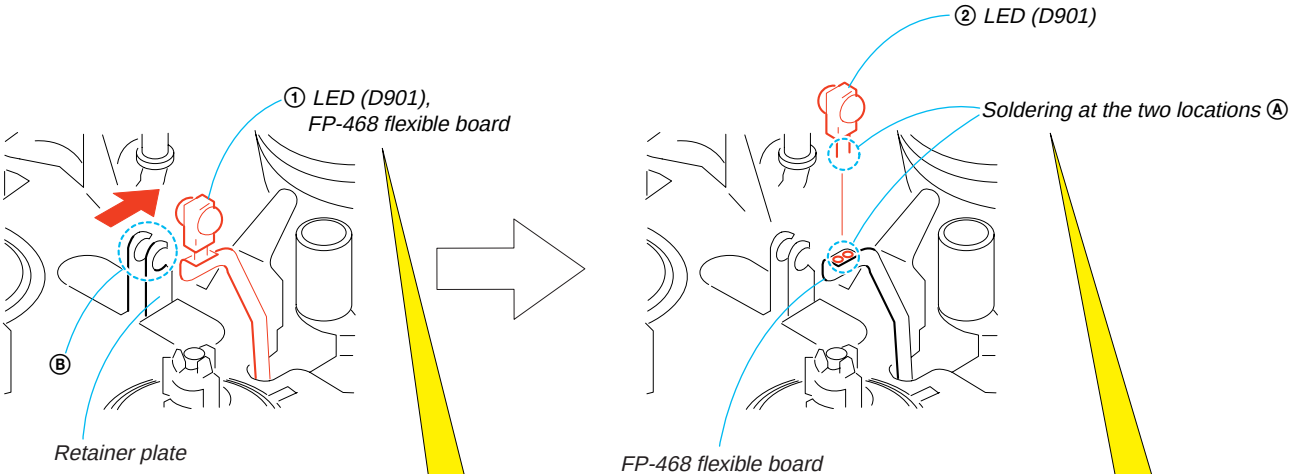
3-7. LED (D901)

1. Removal procedure

1) Remove LED (D901) and the FP-468 flexible board ① from the retainer plate.
2) Remove soldering at the two locations Ⓐ and remove LED (D901) ②.

2. Attachment procedure

1) Install the LED (D901) ② to the FP-468 flexible board by making soldering at the two locations Ⓐ.
2) Fold the FP-468 flexible board ① beneath the LED (D901) with finger tip so that it is inserted into the Ⓑ portion of the retainer plate.



LED (D901), FP-468 FLEXIBLE BOARD

Points to be noted

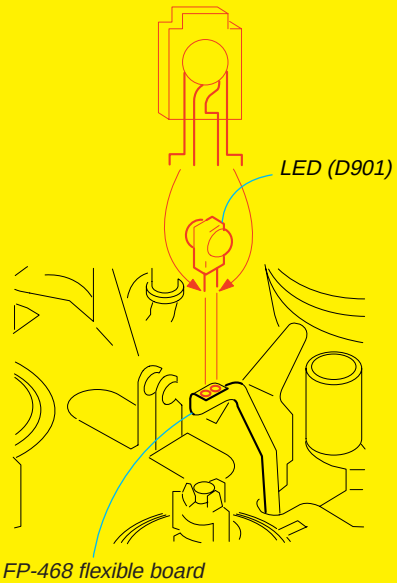
- *There must be no solder crack.*
- *There must be no scars and no stains.*
- *The flexible board must have no breakdown.*
- *The retainer plate and LED block must have no deformation.*

Soldering

Points to be noted

Rubber finger tip protection cover must be used.
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Soldering iron tip: T1-1BC
Temperature of the soldering iron tip: 300 ±10 °C
Contacting time of soldering iron tip: within 2 sec.

Direction of the terminal is specified.



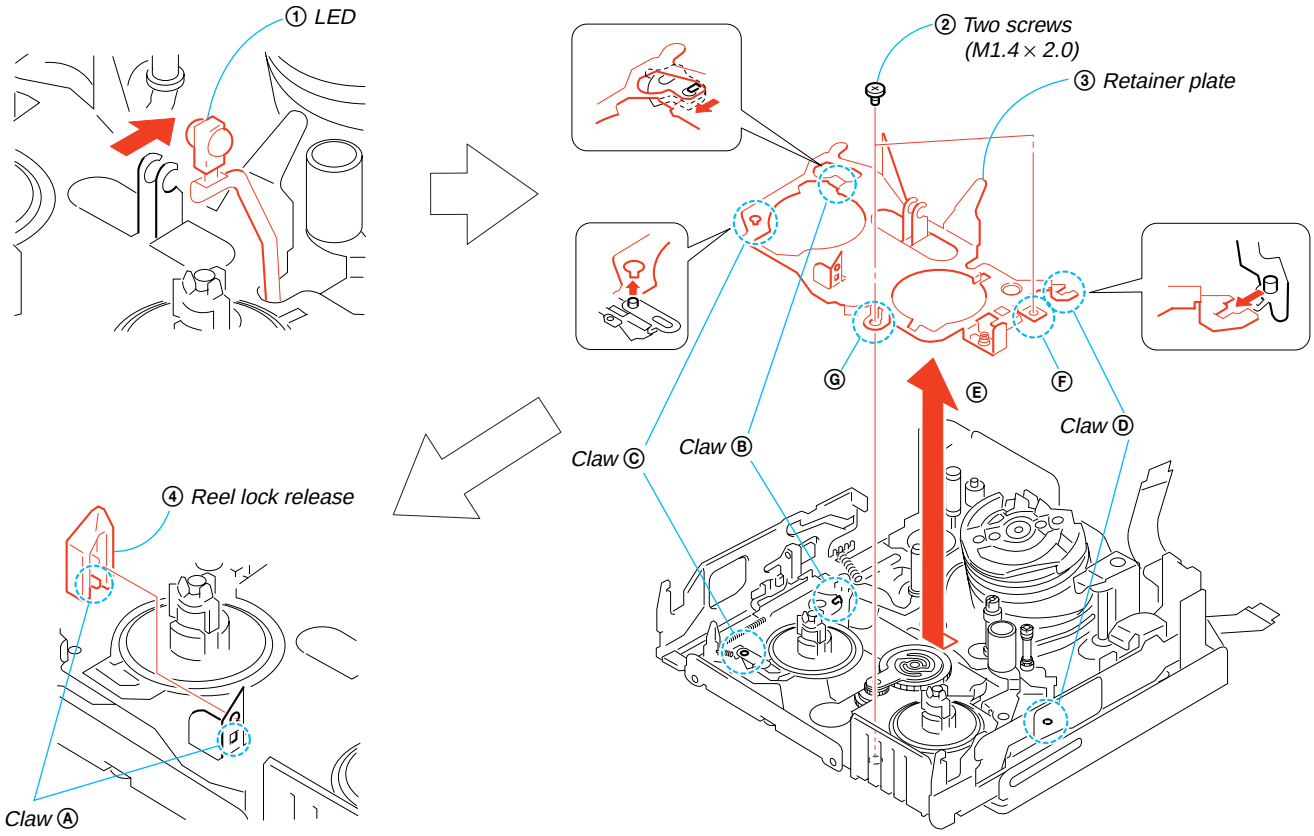
3-8. Retainer Plate

1. Removal procedure

1) Remove LED ① from the retainer plate.
2) Remove the two screws (special head screw M1.4 × 2.0) ②.
3) Release the three claws Ⓑ, Ⓒ and Ⓓ, and remove the retainer plate ③ in the direction of the arrow mark Ⓔ.
4) Release the claw Ⓐ and remove the reel lock release ④.

2. Attachment procedure

1) Install the reel lock release ④.
2) Place the retainer plate ③ on top of the LS chassis block assy and engage the three claws in the order starting from Ⓓ, Ⓒ and Ⓑ.
3) Install the two screws (special head screw M1.4 × 2.0) ② in the order starting from Ⓕ then Ⓖ.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
4) Install LED ① to the retainer plate.



REEL LOCK RELEASE

Key Points in Re-assembling

- *The reel lock release should not be re-used.*
- *The retainer plate must not have any deformation.*
- *The reel lock release should be fully installed. (Should not be left in the half-installed state.)*

RETAINER PLATE

Key Points in Re-assembling

- *All claws must be fully engaged. (Caution : No claws should be left disengaged.)*
- *The flexible board should not be pinched by anything.*
- *The retainer plate must not touch with the MIC terminal.*

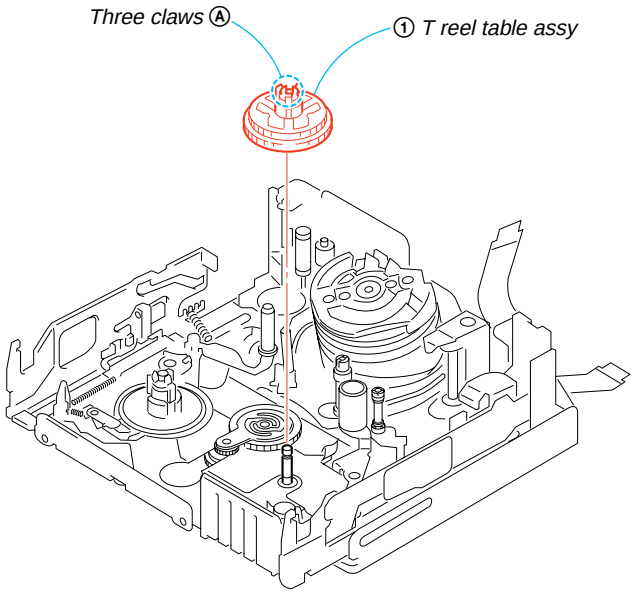
3-9. T Reel Table Assy

1. Removal procedure

1) Remove the T reel table assy ①, averting three claws Ⓐ.

2. Attachment procedure

1) Confirm that the supplied part is really the T reel table assy ①. Insert the T reel table assy ① into the T reel shaft. Install the T reel table assy ① and lock it at the position where you can hear the snapping sound. You can find the locking position by rotating the T reel table assy ①.



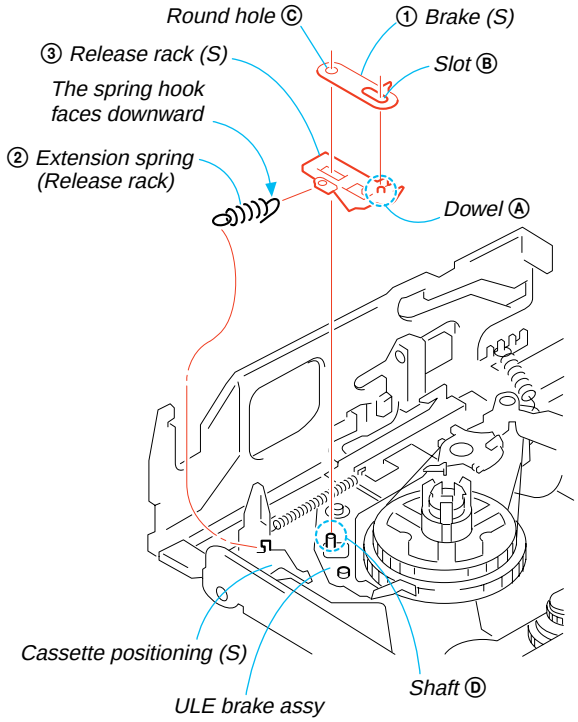
3-10. Brake (S) and Release Rack (S)

1. Removal procedure

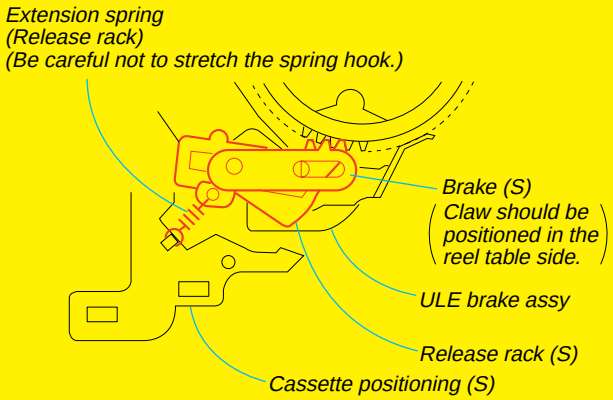
1) Remove the brake (S) ①.
2) Remove the tension spring (release rack (S)) ②.
3) Remove the release rack (S) ③.

2. Attachment procedure

1) Remove the release rack (S) ③ by holding it with a ultra precision tweezers. Install the tension spring (release rack) ② while being careful of the installation direction of the tension spring.
2) Hook the tension spring (release rack) ② on the hook of the cassette positioning (S), and then install it in the ULE brake assy.
3) Insert the slot Ⓑ in the dowel Ⓐ of the release rack (S) ③. Insert the round hole Ⓒ into the pivot shaft Ⓓ and install the brake (S) ①.
(Installation direction: Claw should be positioned in the reel table side.)



Key Points in Re-assembling


Extension spring (Release rack) (Be careful not to stretch the spring hook.)
Brake (S) Claw should be positioned in the reel table side.
ULE brake assy
Release rack (S)
Cassette positioning (S)

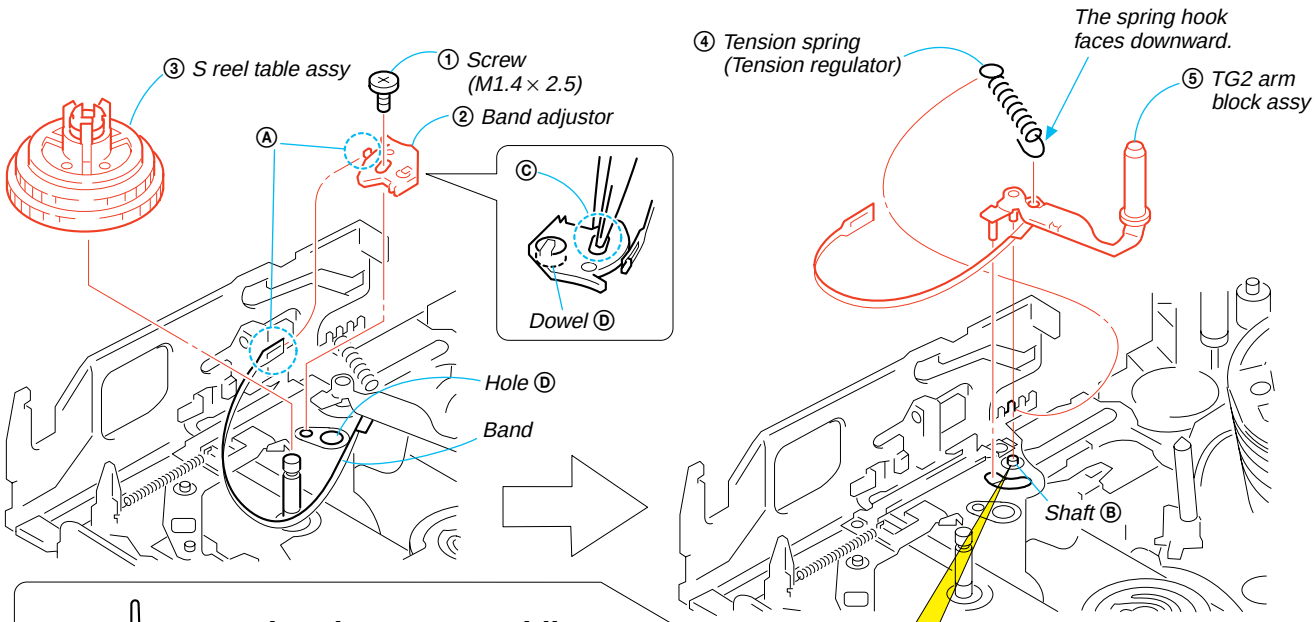
3-11. Band Adjuster, S Reel Table Assy and TG2 Arm Block Assy

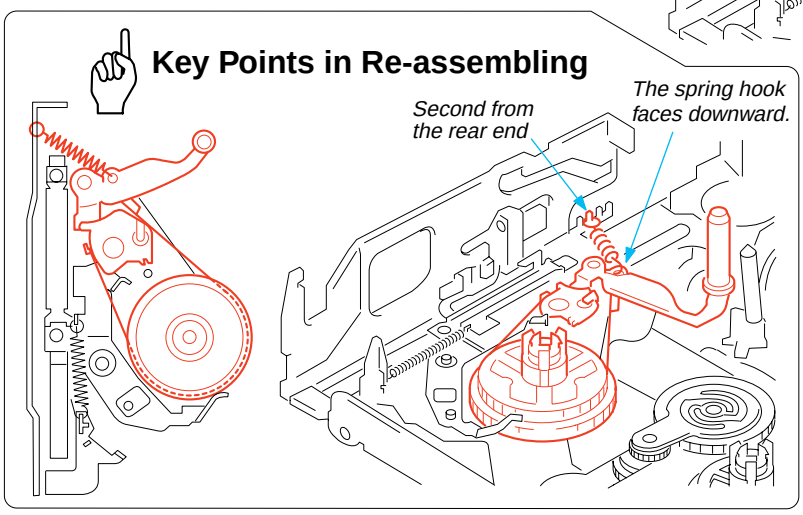
1. Removal procedure

1) Remove the screw (special head screw M1.4 × 2.5) ①.
2) Remove the band Ⓐ of the TG2 arm block and remove the band adjuster ②.
3) Remove the S reel table assy ③.
4) Remove the tension spring (tension regulator spring) ④.
5) Remove the TG2 arm block assy ⑤.

2. Attachment procedure

1) Install the S reel table assy ③.
2) Apply grease in the TG2 arm pivot shaft Ⓑ.
   Amount of grease: a ball of 1.0 mm diameter of grease
   Re-application of grease to the point which is greased already before is not necessary.
3) Hold the TG2 arm block assy ⑤ with tweezers and insert it in the TG2 arm pivot shaft Ⓑ.
4) Hook the tension spring (tension regulator spring) ④ on the TG2 arm block ⑤ with tweezers so that the hook faces downward.
5) Hook the tension spring (tension regulator spring) ④ on the LS chassis block assy (the second hook from the rear end).
6) Hook the Ⓐ portion of the band on the claw of the band adjuster ②.
7) Hold the band adjuster with tweezers as shown in Ⓒ. Insert the band into groove of the S reel table assy while rotating it, and insert the adjuster's dowel into the dowel hole Ⓓ of the LS chassis block assy.
8) Install the band adjuster ② with the screw (special head screw M1.4 × 2.5) ①.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
9) Perform the TG2 FWD Position Adjustment referring to section 4-1.
10) Perform the FWD Back-tension Adjustment referring to section 4-4.
11) Perform the Reel Torque Check referring to section 4-2.

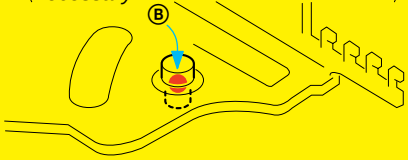




Apply Grease

Points to be noted

During installation, apply grease in the TG2 arm pivot shaft hole.
Amount of grease:
a ball of grease of 1.0 mm diameter
Re-application of grease to the point which is greased already before is not necessary.



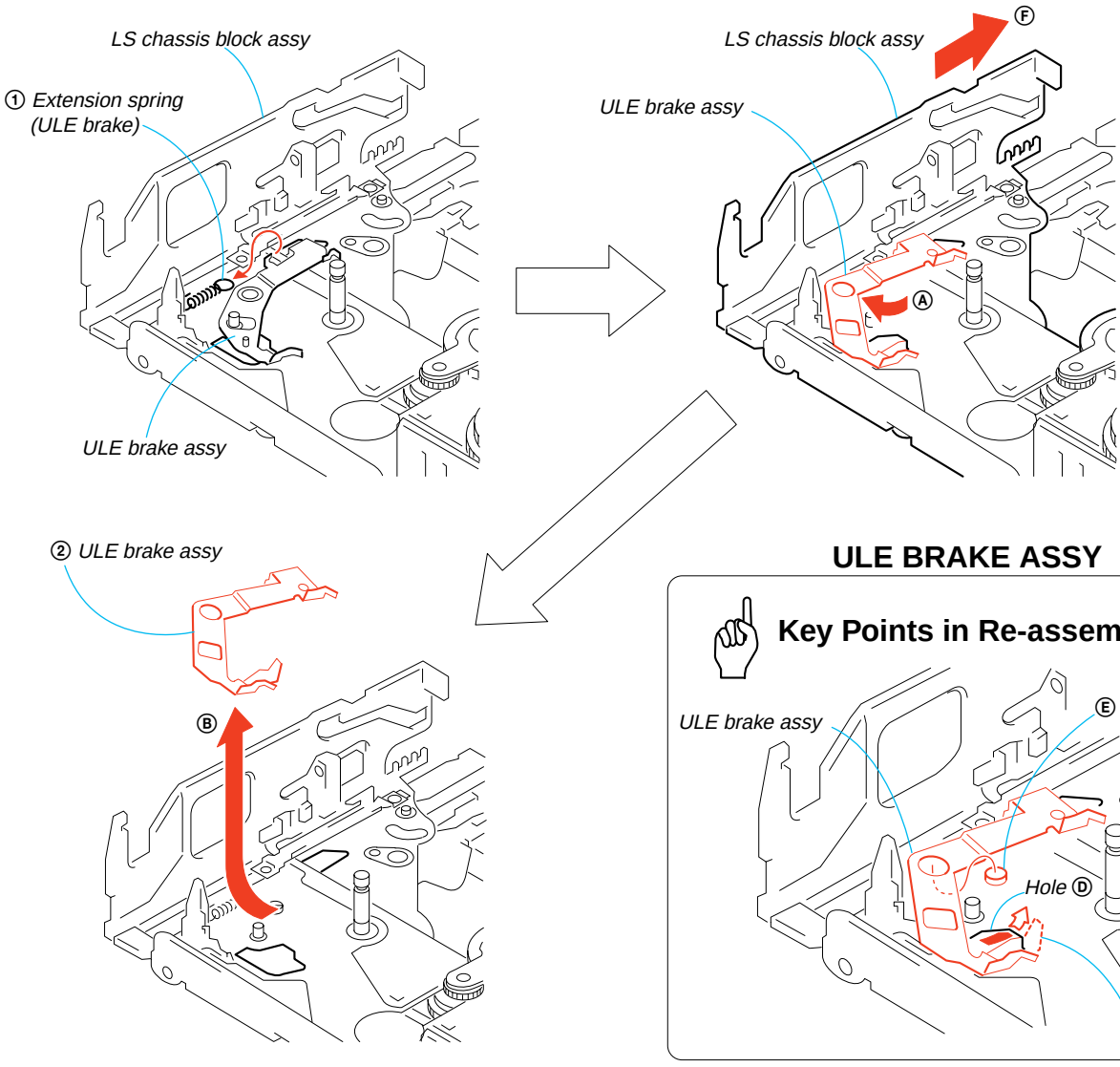
3-12. ULE Brake Assy

1. Removal procedure

1) Remove the tension spring (ULE brake) ① from the ULE brake assy ②.
2) Slide the LS chassis block assy slightly in the direction of the arrow Ⓕ.
3) Slant the ULE brake assy ② in the direction of the arrow Ⓐ and remove it by sliding it in the direction of Ⓑ.

2. Attachment procedure

1) Confirm the front side and the rear side of the ULE brake assy ②. Hold it correctly with tweezers. Insert the portion Ⓒ into the hole Ⓓ of the LS chassis block assy and install the center hole in the Ⓔ of the chassis.
2) Install the tension spring (ULE brake assy) ①.



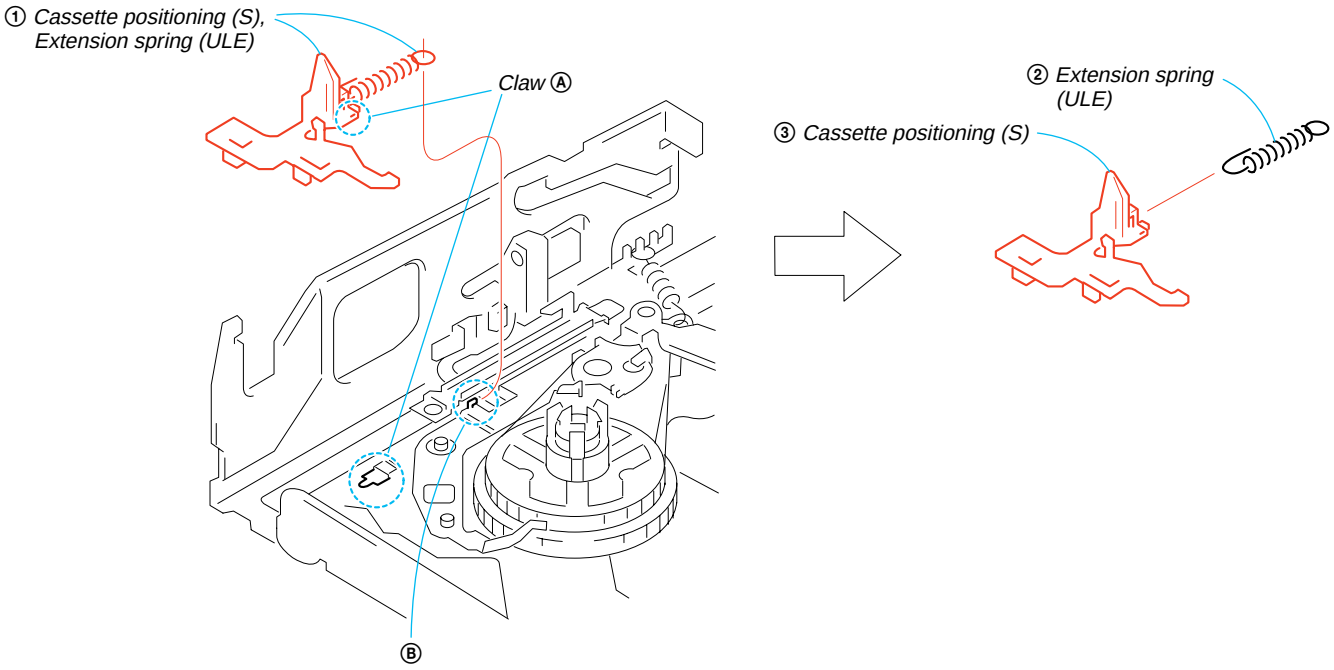
3-13. Cassette Positioning (S)

1. Removal procedure

1) Remove the tention spring (ULE brake) ② from the hook Ⓑ of ULE brake assy.
2) Slide the cassette positioning (S), then remove the cassette positioning (S) and tension spring (ULE brake) ① all together at the same time.
3) Remove the tension spring (ULE brake) ② from the cassette positioning (S) ③.

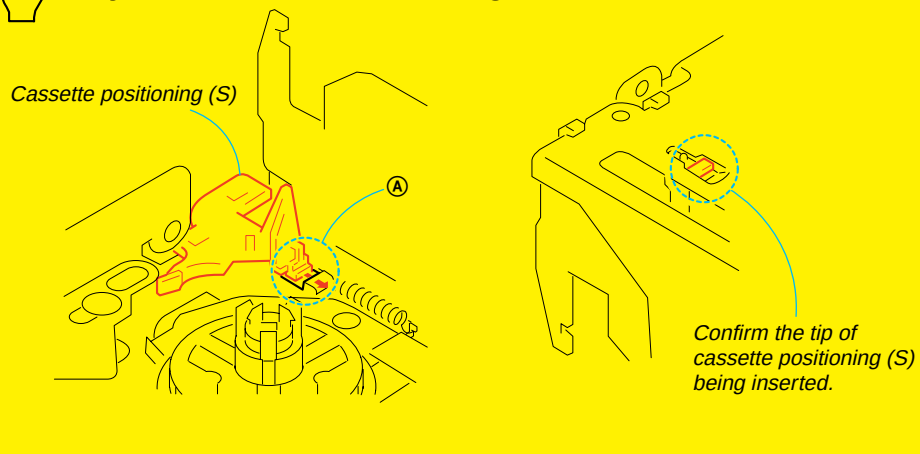
2. Attachment procedure

1) Hook the tension spring (ULE brake) ② on the cassette positioning (S) ③ with tweezers.
2) Hold the cassette positioning (S) ③ with tweezers and insert the top tip of the claw into the LS chassis block assy Ⓐ. Lock it by sliding it in.
3) Install the other end of the tension spring (ULE brake) ② on the hook Ⓑ.



CASSETTE POSITIONING (S)

Key Points in Re-assembling



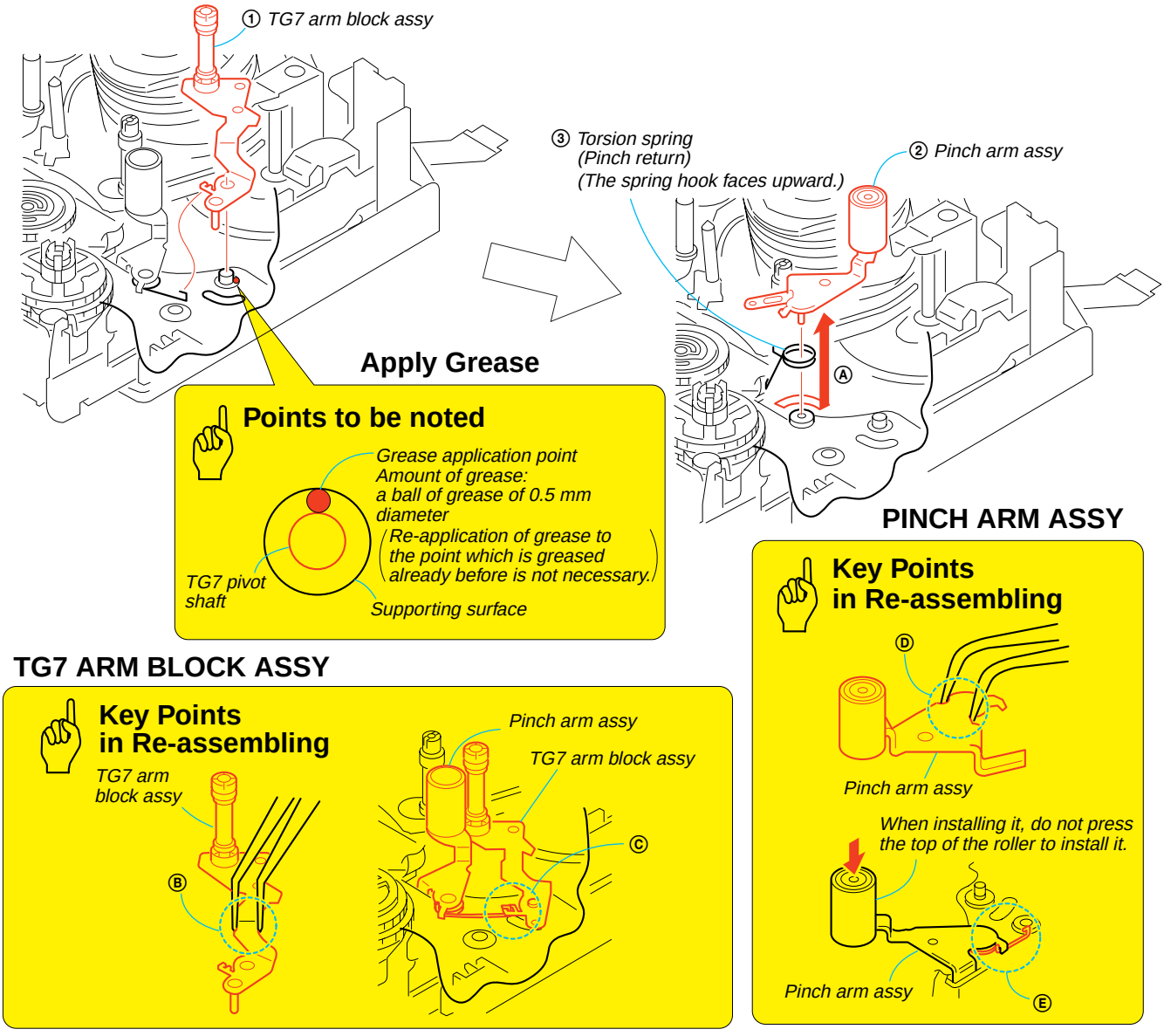
3-14. TG7 Arm Block Assy and Pinch Arm Assy

1. Removal procedure

1) Remove the TG7 arm block assy ①.
2) Rotate the pinch arm assy ② in the direction of the arrow Ⓐ and remove it.
3) Remove the torsion spring (pinch return) ③.

2. Attachment procedure

1) Hold the torsion spring (pinch return) ③ with tweezers. Confirm that the hook faces upward and install it in the bearing.
2) Hold the pinch arm assy ② as shown in Ⓓ and install it in the pinch arm bearing.
3) Hold the torsion coil spring (pinch return) ③ with tweezers and install it as shown in Ⓔ.
4) Apply grease on the supporting surface of the TG7 pivot shaft.
   Amount of grease: a ball of grease of 0.5 mm diamte
   Re-application of grease to the point which is greased already before is not necessary.
5) Hold the TG7 arm block assy ① as shown in Ⓑ and insert it in the pivot shaft of the TG7 arm.
6) Hold the torsion spring (pinch return) ③ with tweezers and install it on the hook of the TG7 arm block assy ① as shown in Ⓒ.
7) Confirm that the torsion spring (pinch return) ③ does not override on the pinch supporting shaft.



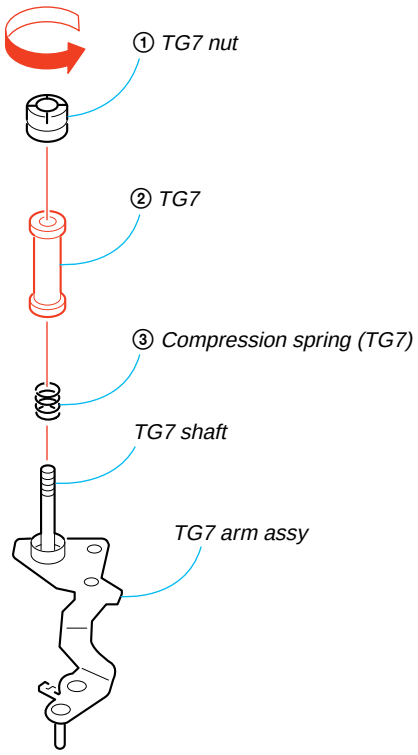
3-15. TG7

1. Removal procedure

1) Remove the TG7 nut ① by turning it in the direction of the arrow.
2) Remove the TG7 ② and compression coil spring ③ from the TG7 arm block assy.

2. Attachment procedure

1) Install the compression coil spring ③ and TG7 ② in the TG7 shaft of the TG7 arm block assy.
2) Install the TG7 nut ① by turning it in the opposite direction of the arrow.



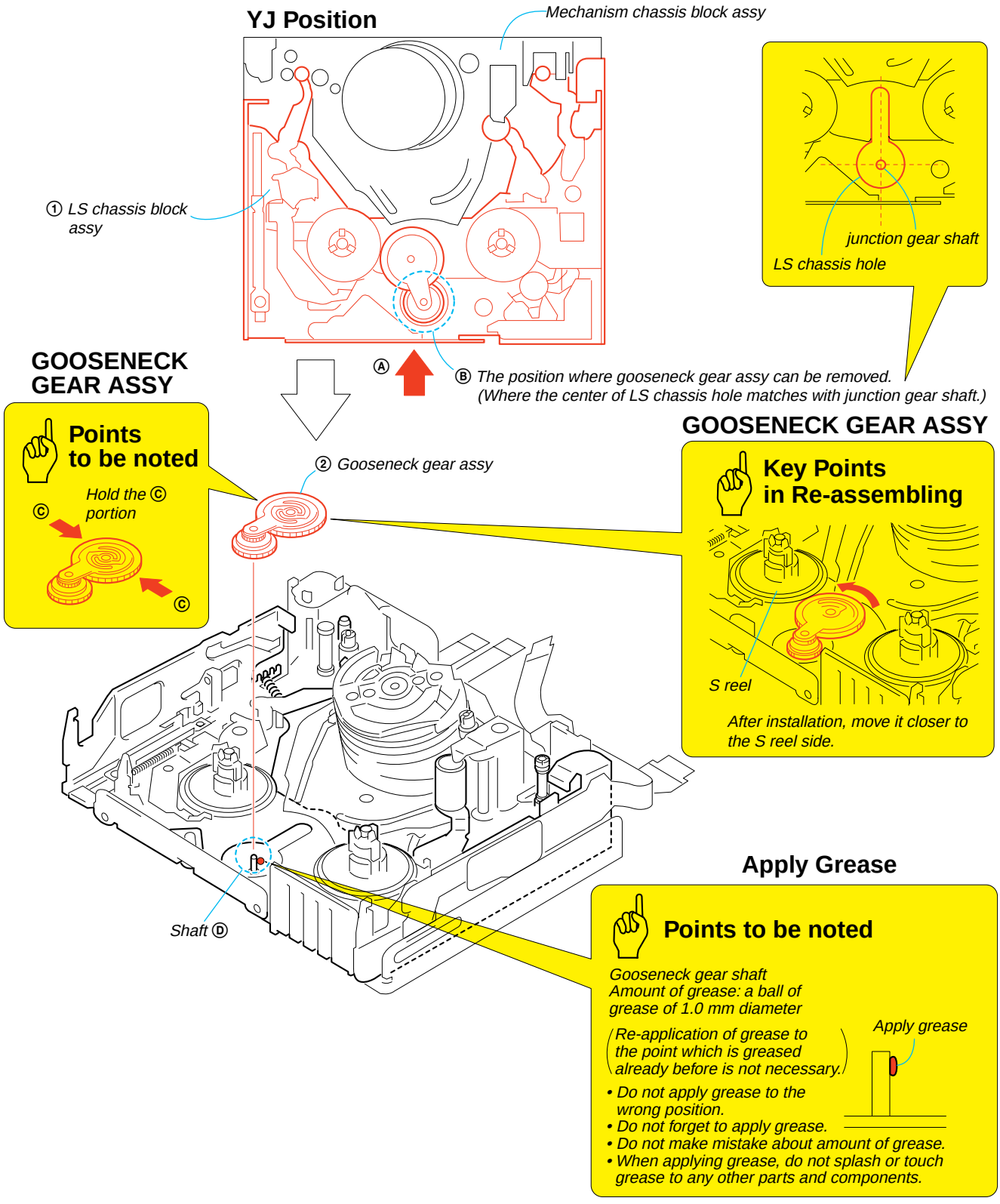
3-16. Gooseneck Gear Assy

1. Removal procedure

1) Move the LS chassis block assy ① in the direction of the arrow Ⓐ to make it in YJ position.
   YJ position: The position Ⓑ where gooseneck gear assy can be removed. (where the center of LS chassis hole matches with junction gear shaft.)
2) Remove the gooseneck gear assy, holding it with Ⓒ.

2. Attachment procedure

1) Apply grease to the gooseneck gear shaft Ⓓ portion.
   Amount of grease: a ball of grease of 1.0 mm diameter
   Need no re-application to one which applied already.
2) Install the gooseneck gear assy, holding it with Ⓒ in the gooseneck gear shaft.
3) Move it closer to the S reel.


YJ Position
Mechanism chassis block assy
① LS chassis block assy
junction gear shaft
LS chassis hole
Ⓐ
Ⓑ The position where gooseneck gear assy can be removed.
(Where the center of LS chassis hole matches with junction gear shaft.)
GOOSENECK GEAR ASSY
Points to be noted
Hold the Ⓒ portion
Ⓒ
Ⓒ
② Gooseneck gear assy
GOOSENECK GEAR ASSY
Key Points in Re-assembling
S reel
After installation, move it closer to the S reel side.
Shaft Ⓓ
Apply Grease
Points to be noted
Gooseneck gear shaft
Amount of grease: a ball of grease of 1.0 mm diameter
Re-application of grease to the point which is greased already before is not necessary.
Apply grease
• Do not apply grease to the wrong position.
• Do not forget to apply grease.
• Do not make mistake about amount of grease.
• When applying grease, do not splash or touch grease to any other parts and components.

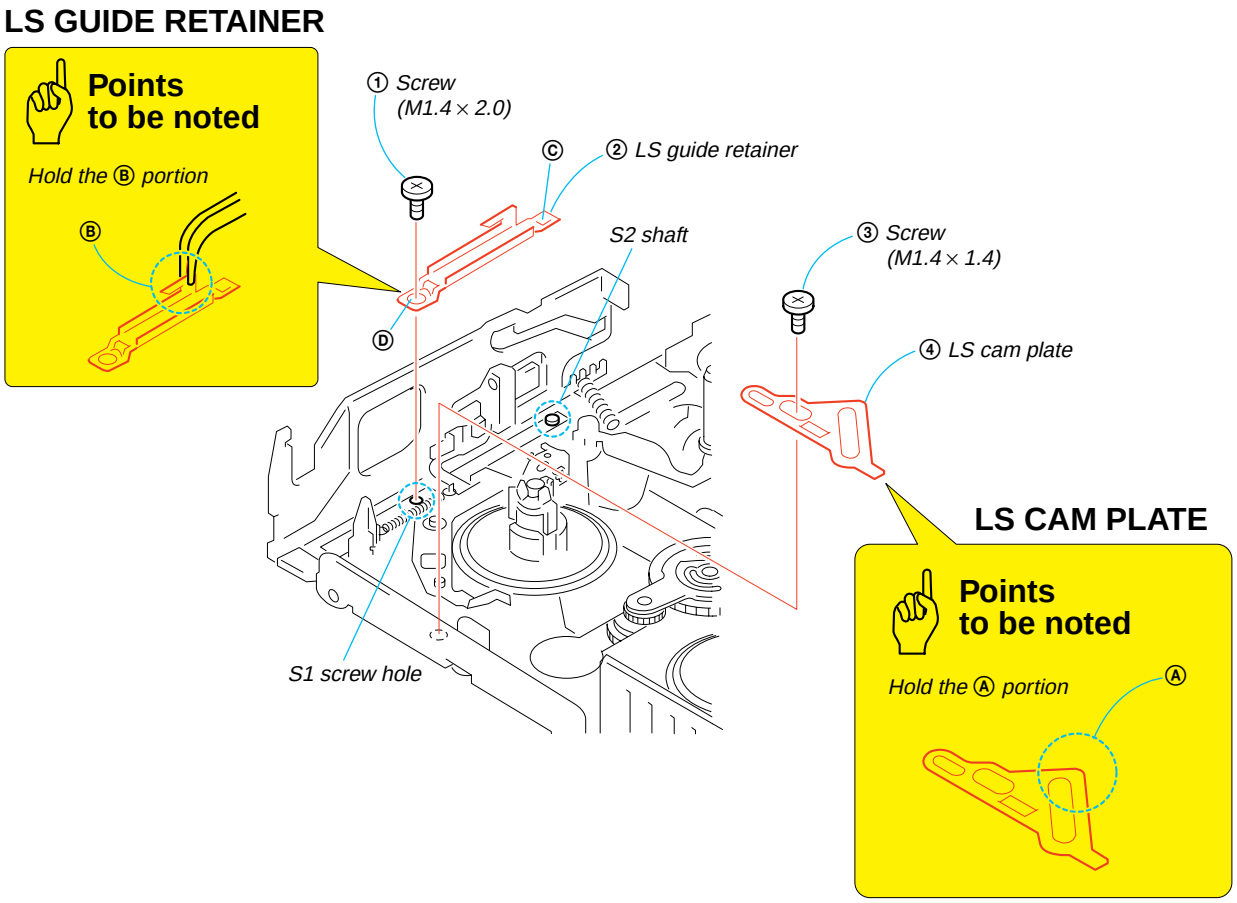
3-17. LS Guide Retainer and LS Cam Plate

1. Removal procedure

1) Remove the screw (special head screw M1.4 × 2.0) ①. and remove the LS guide retainer ②.
2) Remove the screw (special head screw M1.4 × 1.4) ③ and remove the LS cam plate ④.

2. Attachment procedure

1) Hold the LS cam plate with Ⓐ and place it aligning the two dowels. Tighten the screw (special head screw M1.4 × 1.4) ③ in half way.
2) Adjust the LS cam plate by referring to section 4-5.
3) Hold the LS guide retainer ② with Ⓑ and hook its key hole Ⓒ on the S2 shaft, and align the hole Ⓓ to S1 screw hole.
4) Install the screw (special head screw M1.4 × 2.0) ① in the S1 screw hole.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



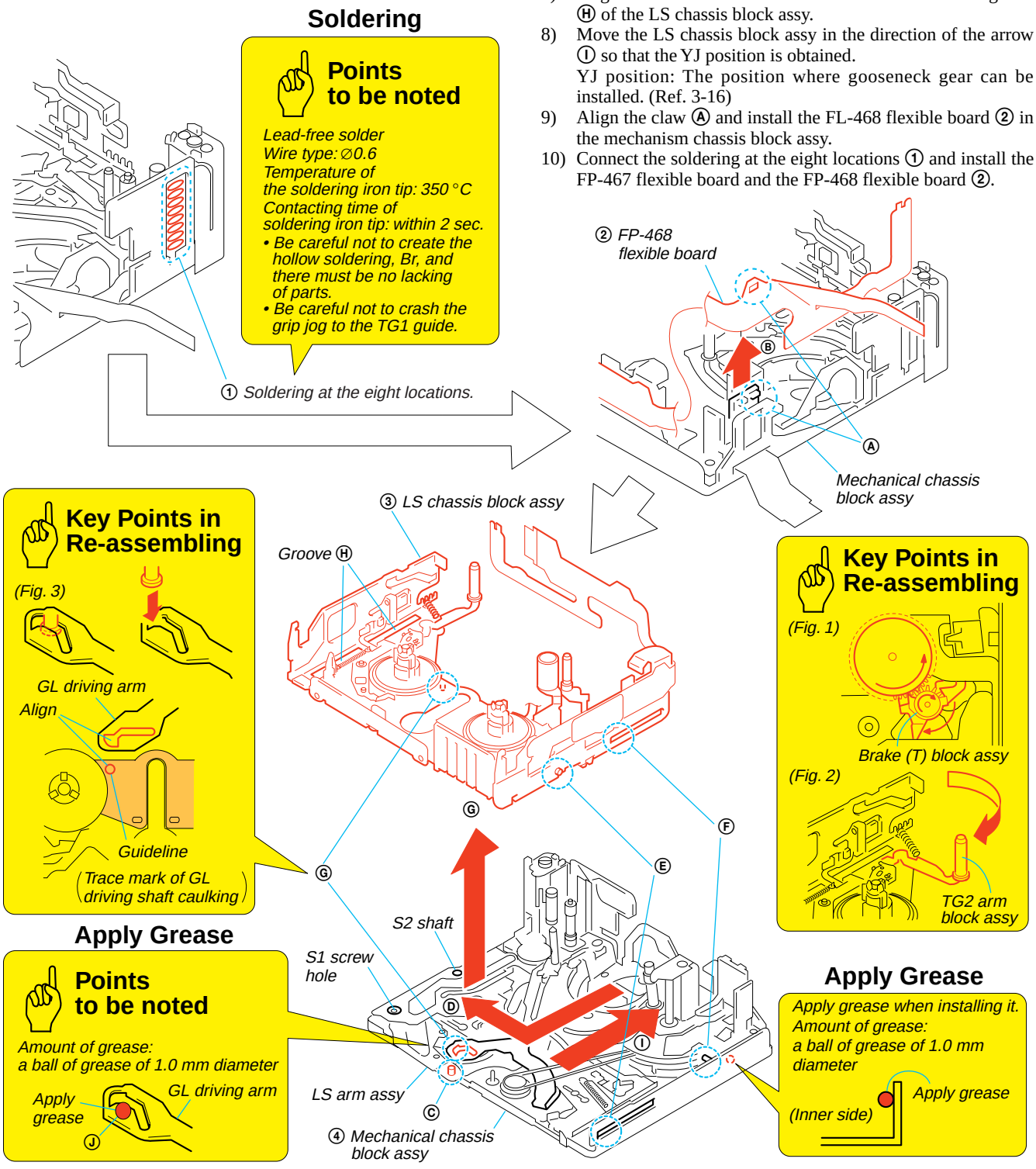
3-18. LS Chassis Block Assy and Mechanical Chassis Block Assy

1. Removal procedure

1) Remove soldering at the eight locations ①.
2) Release the claw Ⓐ and remove the FP-468 flexible board ② from the mechanical chassis block assy in the direction of the arrow Ⓑ.
3) Raise the front portion of the LS chassis block assy ③ so that the pin Ⓒ of the LS arm assy is removed. Move the LS chassis block assy ③ in the direction of the arrow Ⓓ and release the three pins of Ⓔ, Ⓕ and Ⓖ, and also groove.
4) Remove the LS chassis block ④ from the mechanical chassis block assy.

2. Attachment procedure

1) Apply grease to the GL drive arm Ⓙ portion and mechanism chassis block L.
   Amount of grease: a ball of grease of 1.0 mm diameter
2) Rotate the T reel table assy in the counter-clockwise direction and move the brake T block to the position shown in Fig. 1. (Fig. 1)
3) Move the TG2 arm block to the inner side. (Fig. 2)
4) Hold the cam groove of the GL driving arm with tweezers through LS chassis hole Ⓚ and pick it up.
5) Insert the GL drive shaft into the cam groove of the raised GL drive arm using the trace mark of caulking on the side of the S reel of the LS chassis block assy. (Fig. 3)
6) Align the pins Ⓔ, Ⓕ and Ⓖ with the grooves.
7) Align the left side S1 screw hole and S2 shaft with the goove Ⓗ of the LS chassis block assy.
8) Move the LS chassis block assy in the direction of the arrow Ⓘ so that the YJ position is obtained.
   YJ position: The position where gooseneck gear can be installed. (Ref. 3-16)
9) Align the claw Ⓐ and install the FL-468 flexible board ② in the mechanism chassis block assy.
10) Connect the soldering at the eight locations ① and install the FP-467 flexible board and the FP-468 flexible board ②.



3-19. Brake (T) Block Assy

1. Removal procedure

1) Hold the Ⓐ portion and remove the brake (T) block assy ①.

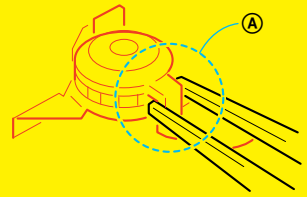
2. Attachment procedure

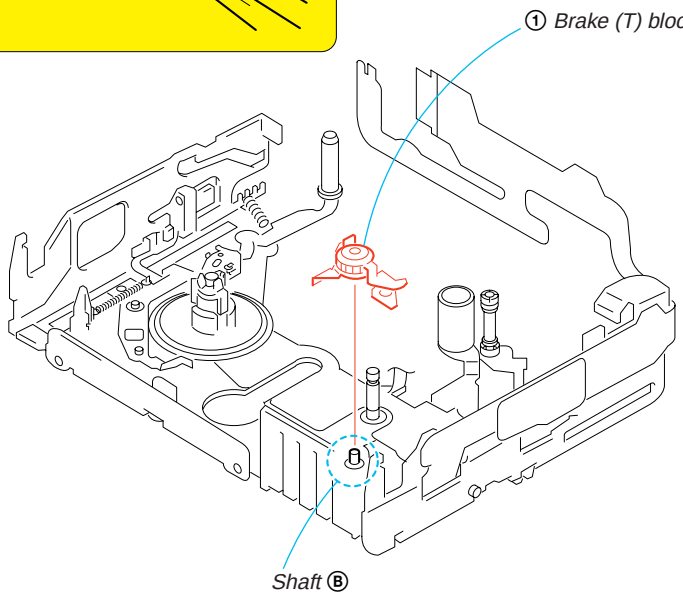
1) Hold the Ⓐ portion of the brake (T) block assy ①. While inserting the slot portion into the notch of the LS chassis block assy, install it into the shaft Ⓑ.
2) After completing installation of T reel table assy (Refer to 3-9.), rotate the brake (T) block assy ① in the clockwise direction by rotating T reel talbe assy in the counter-clockwise direction. (Fig. 1)

BRAKE (T) BLOCK ASSY

Points to be noted

Hold the Ⓐ portion

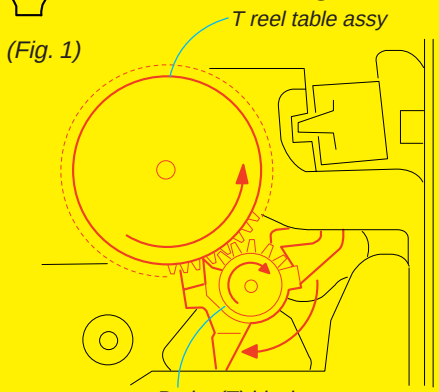




BRAKE (T) BLOCK ASSY

Key Points in Re-assembling

(Fig. 1)



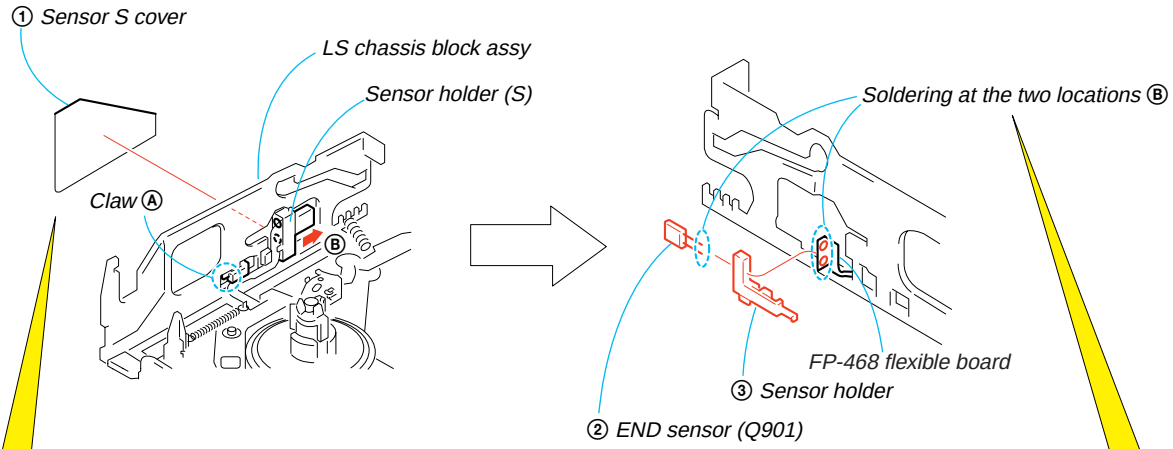
3-20. END Sensor (Q901)

1. Removal procedure

1) Peel off the sensor S cover ①.
2) Release the claw Ⓐ of the sensor holder (S) ③. Remove it from the LS chassis block assy by sliding it in the direction of the arrow Ⓑ.
3) Remove soldering at the two locations and remove the END sensor (Q901) ② and the sensor holder (S) ①.

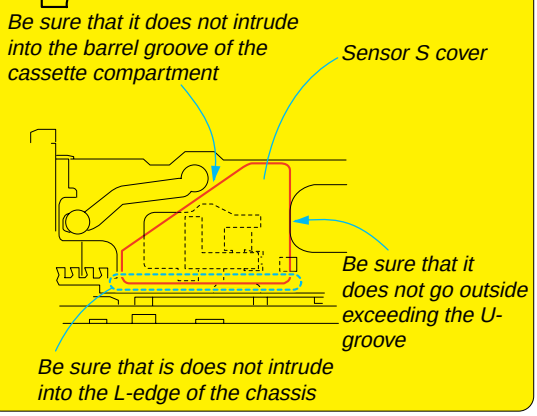
2. Attachment procedure

1) Connect the END sensor (Q901) ② and the sensor holder (S) ③ to the FP-468 flexible board by soldering them at the two locations Ⓑ.
2) Slide the END sensor (Q901) ② and the sensor holder (S) ③ in the direction of the arrow Ⓒ to install them in the LS chassis block assy.
3) Hook the flexible board on the end of the Ⓓ portion.
4) Attach the sensor S cover ①.



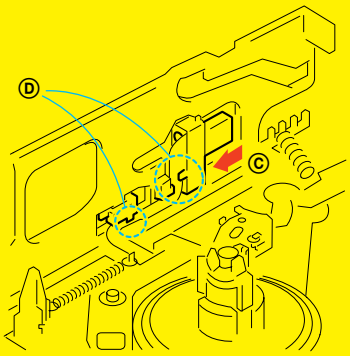
SENSOR S COVER

Key Points in Re-assembling


Be sure that it does not intrude into the barrel groove of the cassette compartment
Sensor S cover
Be sure that it does not go outside exceeding the U-groove
Be sure that is does not intrude into the L-edge of the chassis

END SENSOR (Q901), SENSOR HOLDER (S)

Key Points in Re-assembling



Soldering

Points to be noted

Use the rubber finger tip
cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec

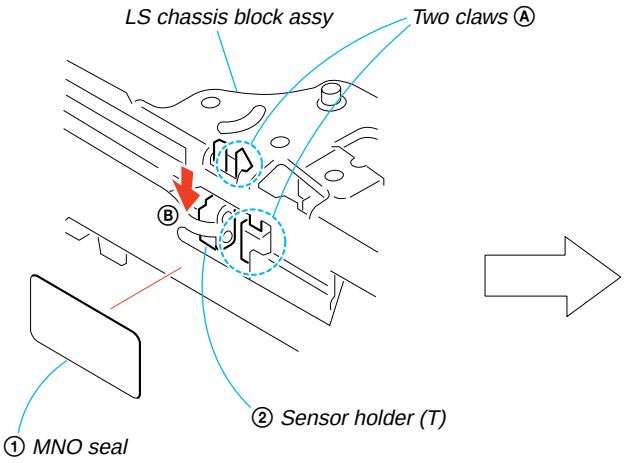
3-21. TOP Sensor (Q902)

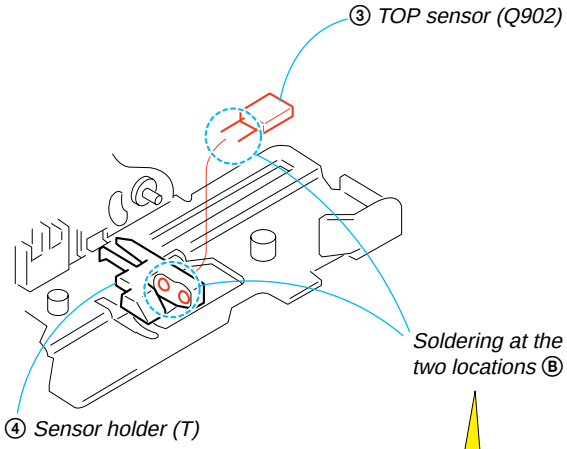
1. Removal procedure

1) Peel off the MNO seal ①.
2) Release the two claws of the sensor holder (T) ② at the two locations Ⓐ. Remove it from the LS chassis block assy by sliding it in the direction of the arrow Ⓑ.
3) Remove the soldering at the two locations Ⓑ and remove the TOP sensor (Q902) ③ and the sensor holder (T) ④.

2. Attachment procedure

1) Connect the TOP sensor (Q902) ③ and the sensor holder (T) ④ to the FP-468 flexible board by soldering them at the two locations Ⓑ.
2) Engage the two claws Ⓐ to install the TOP sensor (Q902) ③ and the sensor holder (T) ④ in the LS chassis block assy.
3) Attach the MNO seal ①.





Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec

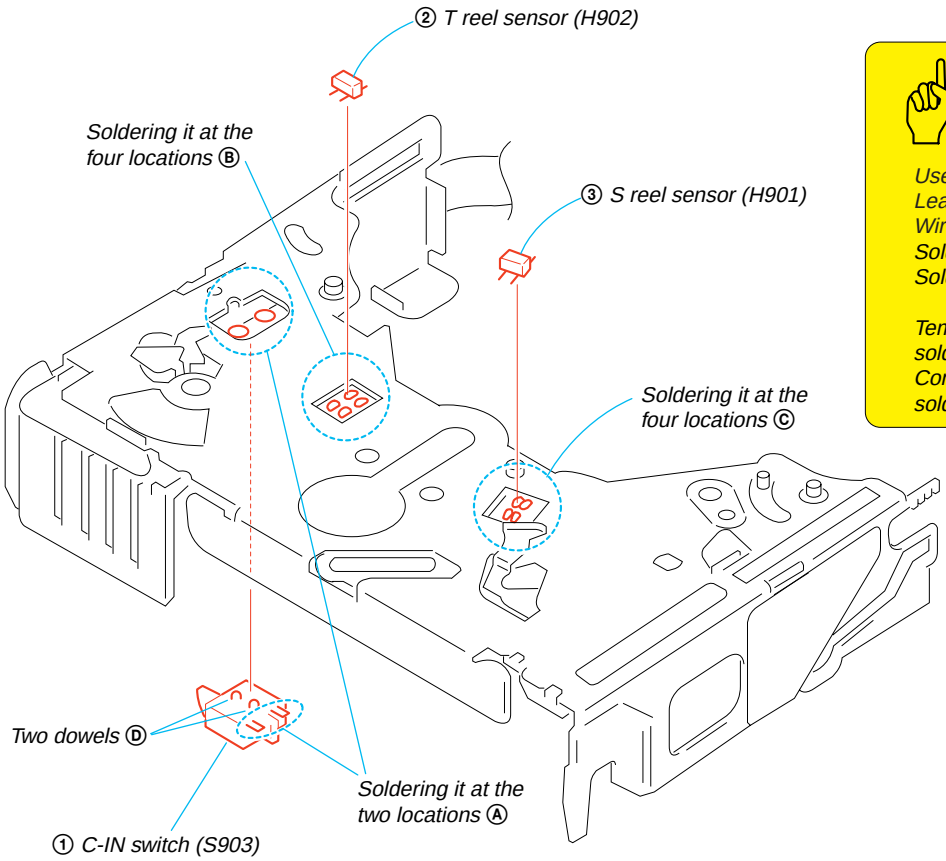
3-22. C-IN Switch (S903), S Reel Sensor (H901) and T Reel Sensor (H902)

1. Removal procedure

1) Remove soldering at the two locations Ⓐ and remove the C-IN switch (S903) ①.
2) Remove soldering at the four locations Ⓑ and remove the T reel sensor (H902) ②.
3) Remove soldering at the four locations Ⓑ and remove the S reel sensor (H901) ③.

2. Attachment procedure

1) Connect the S reel sensor (H901) ③ to the FP-468 flexible board by soldering it at the four locations Ⓒ.
2) Connect the T reel sensor (H902) ② to the FP-468 flexible board by soldering it at the four locations Ⓑ.
3) Align the two dowels Ⓓ and connect the C-IN switch (S903) ① to the FP-468 flexible board by soldering it at the two locations Ⓐ.


② T reel sensor (H902)
Soldering it at the four locations Ⓑ
③ S reel sensor (H901)
Soldering it at the four locations Ⓒ
Two dowels Ⓓ
Soldering it at the two locations Ⓐ
① C-IN switch (S903)

Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ± 10 °C
Contacting time of soldering iron tip : within 2 sec

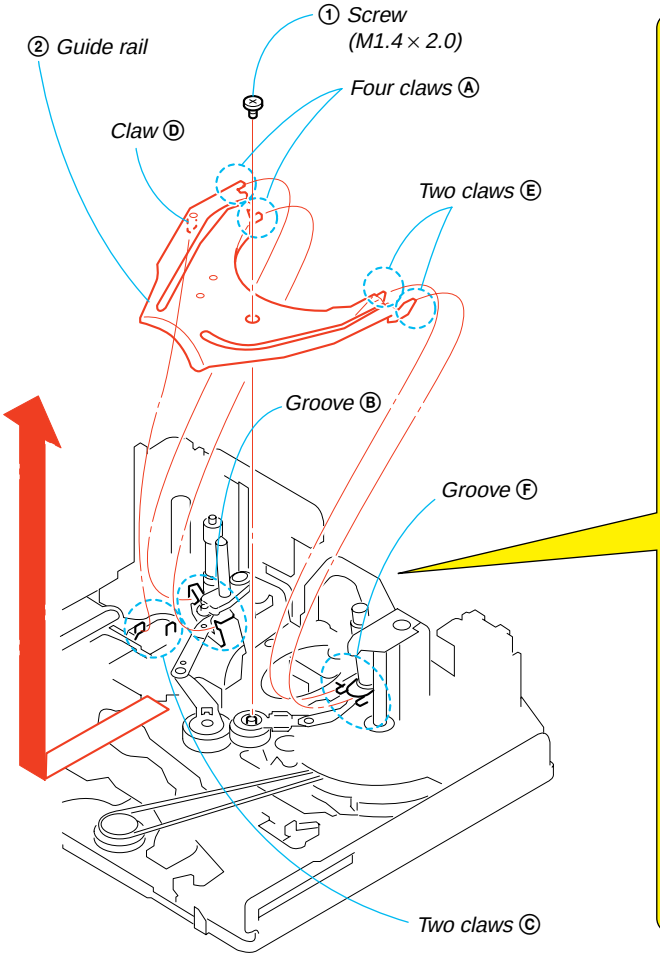
3-23. Guide Rail

1. Removal procedure

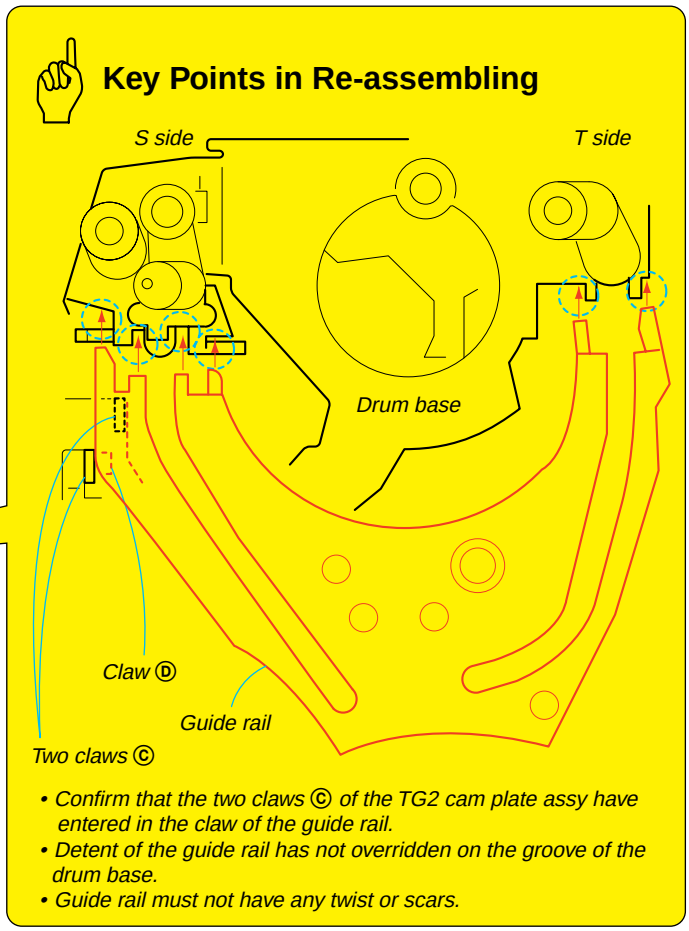
1) Remove the screw (special head screw M1.4 × 2.0) ①.
2) Remove the guide rail ② in the direction of the arrow.

2. Attachment procedure

1) Hold the center of the guide rail ②. While pressing the TG2 cam plate assy, insert the four claws Ⓐ of the guide rail in a slant angle from the top into the drum base's groove Ⓑ. (Insert the top tip of the rail at the same time.) Confirm at this time that the two claws of the TG cam plate assy have entered in the claw Ⓓ of the guide rail.
2) Insert the two claws Ⓔ of the T side guide rail into the groove Ⓕ of the drum base.
3) Tighten the screw (special head screw M1.4 × 2.0) ①.
Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



GUIDE RAIL


Key Points in Re-assembling
S side
T side
Drum base
Claw Ⓓ
Guide rail
Two claws Ⓒ
• Confirm that the two claws Ⓒ of the TG2 cam plate assy have entered in the claw of the guide rail.
• Detent of the guide rail has not overridden on the groove of the drum base.
• Guide rail must not have any twist or scars.

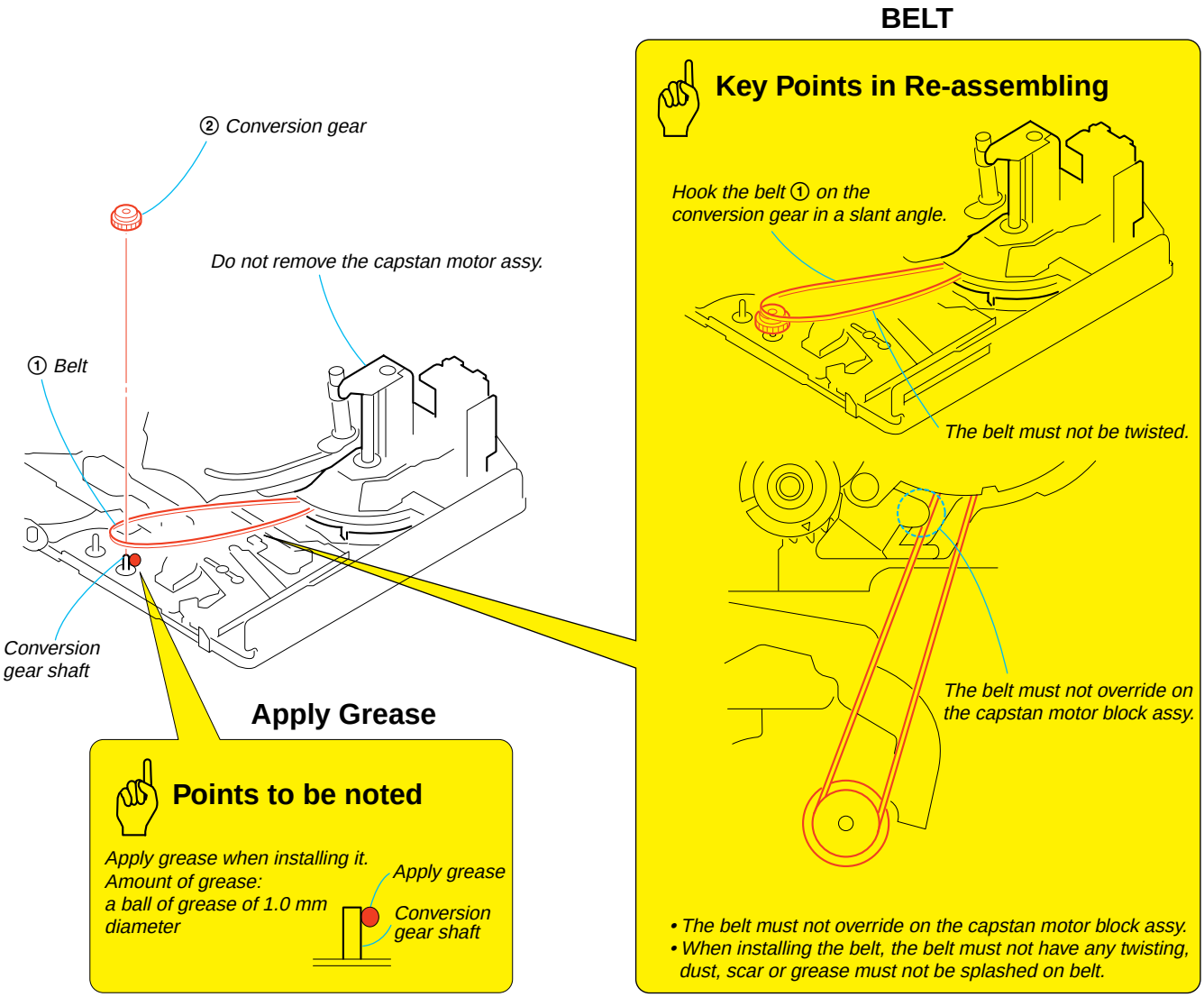
3-24. Conversion Gear

1. Removal procedure

1) Remove the belt ① from the conversion gear.
2) Remove the conversion gear ② from the conversion gear shaft.

2. Attachment procedure

1) Apply grease to the conversion gear shaft.
   Amount of grease: a ball of grease of 1.0 mm diameter
2) Install the conversion gear ② in the conversion gear shaft.
3) Hook the belt ① on the conversion gear in a slant angle and install it by rotating the conversion gear with fingertip.


② Conversion gear
Do not remove the capstan motor assy.
① Belt
Conversion gear shaft
Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
Apply grease
Conversion gear shaft
BELT
Key Points in Re-assembling
Hook the belt ① on the conversion gear in a slant angle.
The belt must not be twisted.
The belt must not override on the capstan motor block assy.
• The belt must not override on the capstan motor block assy.
• When installing the belt, the belt must not have any twisting, dust, scar or grease must not be splashed on belt.

3-25. Coaster (S) Block Assy and Coaster (T) Block Assy

1. Removal procedure

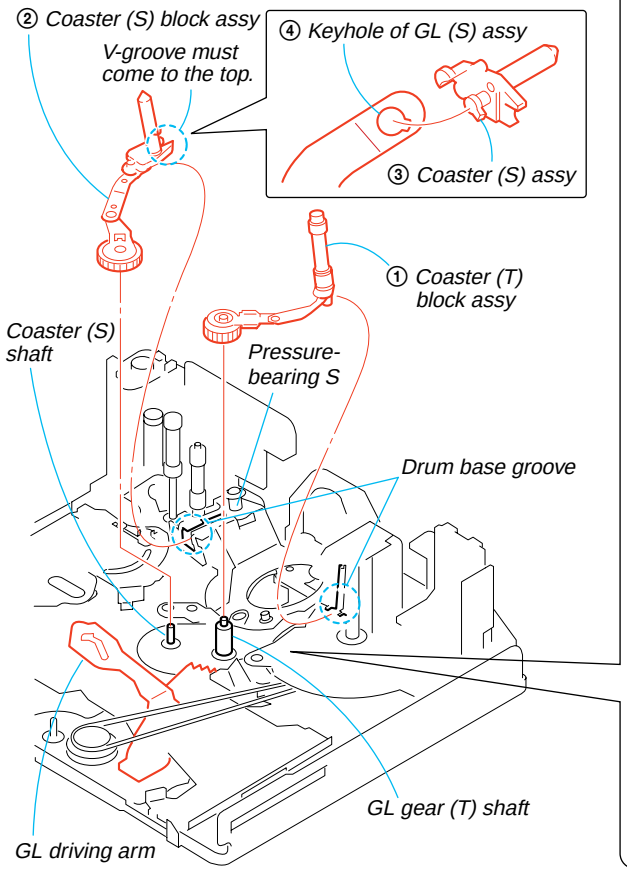
1) Remove the coaster (T) block assy ① from the coaster (T) block shaft. Remove the coaster (T) block assy from the right groove of the drum base.
2) Remove the coaster (S) block assy ② from the coaster (S) block shaft. Remove the coaster (S) block assy from the left groove of the drum base.
3) Remove coaster (S) assy ③ by rotating it through the key hole of GL (S) assy ④.

2. Attachment procedure

1) Install the coaster (S) assy ③ into the key hole of the GL (S) assy ④ by rotating it.
2) Insert the coaster (S) block assy ② into the coaster (S) block shaft. While aligning it with the left groove of the drum base, push it in the way that the V-groove comes to the top until it reaches the pressure-bearing S.
3) Push in the coaster (T) block assy ① along with the right groove of the drum base. Align the phase of the GL gear S, GL gear T and the GL drive arm at the three phasing locations. Then install the coaster (T) block assy ① in the coaster (T) block assy shaft.

Key Points in Re-assembling

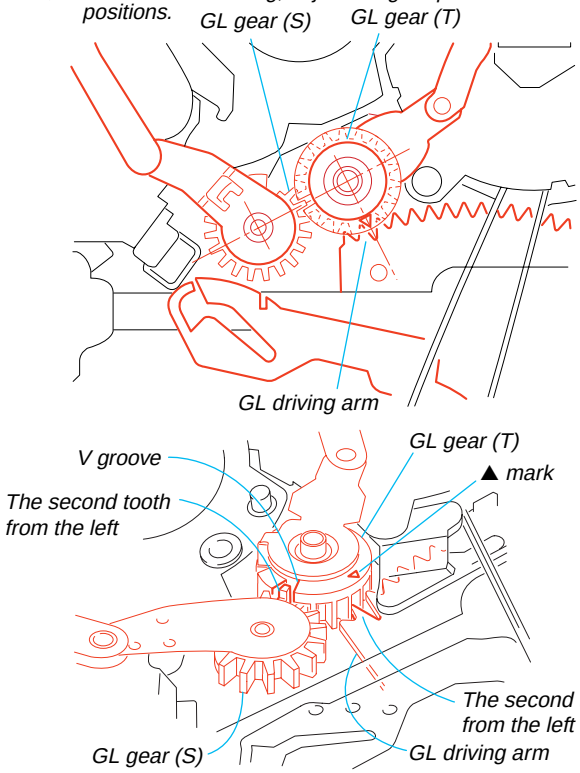
- *When aligning the coaster (S) assy with the left groove of the drum base, the V-groove must come to the top.*
- *TG4 and TG5 must not have any stain and their arms must not be deformed.*


② Coaster (S) block assy
V-groove must come to the top.
④ Keyhole of GL (S) assy
③ Coaster (S) assy
① Coaster (T) block assy
Coaster (S) shaft
Pressure-bearing S
Drum base groove
GL gear (T) shaft
GL driving arm

Phase Adjustment

Key Points in Re-assembling

When re-assembling, adjust the gear phase at the three positions.



- *The second tooth from the left of the GL gear (S) and the V-groove of the GL gear (T) must be in phase.*
- *The second tooth from the left of the GL drive arm and the ▲ mark must be in phase.*

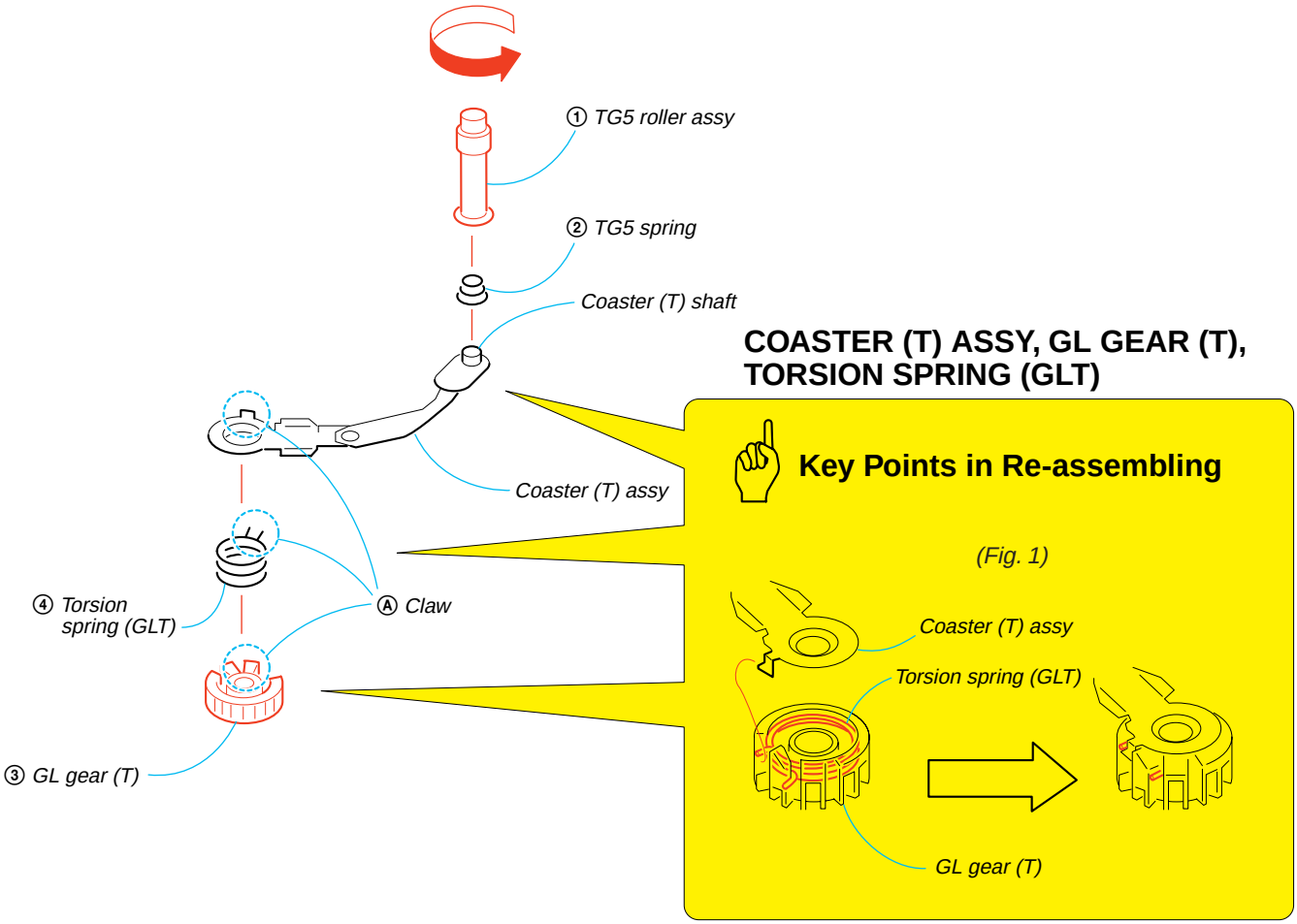
3-26. TG5 Roller Assy and GL Gear (T)

1. Removal procedure

1) Rotate the TG5 roller assy ① in the direction of the arrow and remove the TG5 roller assy ① and the TG5 spring ② from the coaster (T) assy.
2) Release the claw (A) and remove the GL gear (T) ③ and the torsion coil spring (GLT) ④ from the coaster (T) assy.

2. Attachment procedure

1) Install the GL gear (T) ③ and the torsion coil spring (GLT) ④ into the coaster (T) assy.
2) Install the TG5 spring ② into the coaster (T) assy.
3) Install the TG5 roller assy ① into the coaster (T) assy by rotating it in the direction opposite to the arrow.



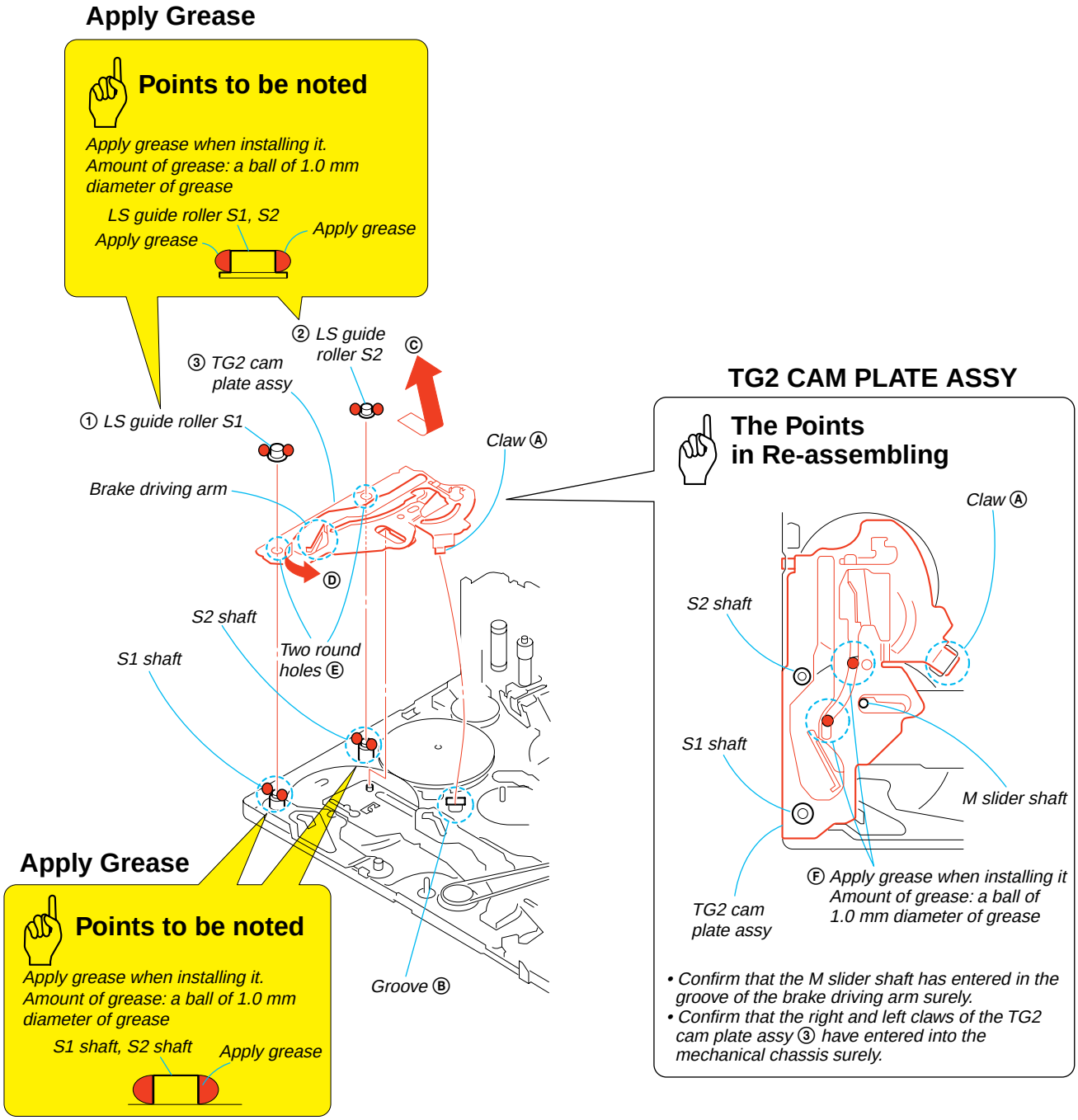
3-27. TG2 Cam Plate Assy

1. Removal procedure

1) Remove the LS guide roller (S1) ① from the S1 shaft.
2) Remove the LS guide roller (S2) ② from the S2 shaft.
3) Release the claw Ⓐ of the TG2 cam plate assy ③ from the right groove Ⓑ of the mechanical chassis.
4) Remove the TG2 cam plate assy ③ in the direction of the arrow Ⓒ.

2. Attachment procedure

1) Move the brake driving arm of the TG2 cam plate assy ③ in the direction of the arrow Ⓓ.
2) Insert the right claw Ⓐ of the TG2 cam plate assy ③ into the right groove Ⓑ of the mechanical chassis first.
3) Install the two round holes Ⓔ of the TG2 cam plate assy ③ into the S1 shaft and the S2 shaft.
4) Apply grease in the Ⓕ portion of the TG2 cam plate assy.
   Amount of grease: a ball of 1.0 mm diameter of grease
5) Apply grease to both sides of the S1 shaft and the S2 shaft.
   Amount of grease: a ball of 1.0 mm diameter of grease
6) Apply grease to both sides of the LS guide roller S1, S2.
7) Install the LS guide roller S1 ① in the S1 shaft.
8) Install the LS guide roller S2 ② in the S2 shaft.


Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
LS guide roller S1, S2
Apply grease
Apply grease
② LS guide roller S2
Ⓒ
③ TG2 cam plate assy
① LS guide roller S1
Claw Ⓐ
Brake driving arm
Ⓓ
S2 shaft
S1 shaft
Two round holes Ⓔ
Groove Ⓑ
Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
S1 shaft, S2 shaft
Apply grease
TG2 CAM PLATE ASSY
The Points in Re-assembling
Claw Ⓐ
S2 shaft
S1 shaft
M slider shaft
Ⓕ Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
TG2 cam plate assy
• Confirm that the M slider shaft has entered in the groove of the brake driving arm surely.
• Confirm that the right and left claws of the TG2 cam plate assy ③ have entered into the mechanical chassis surely.

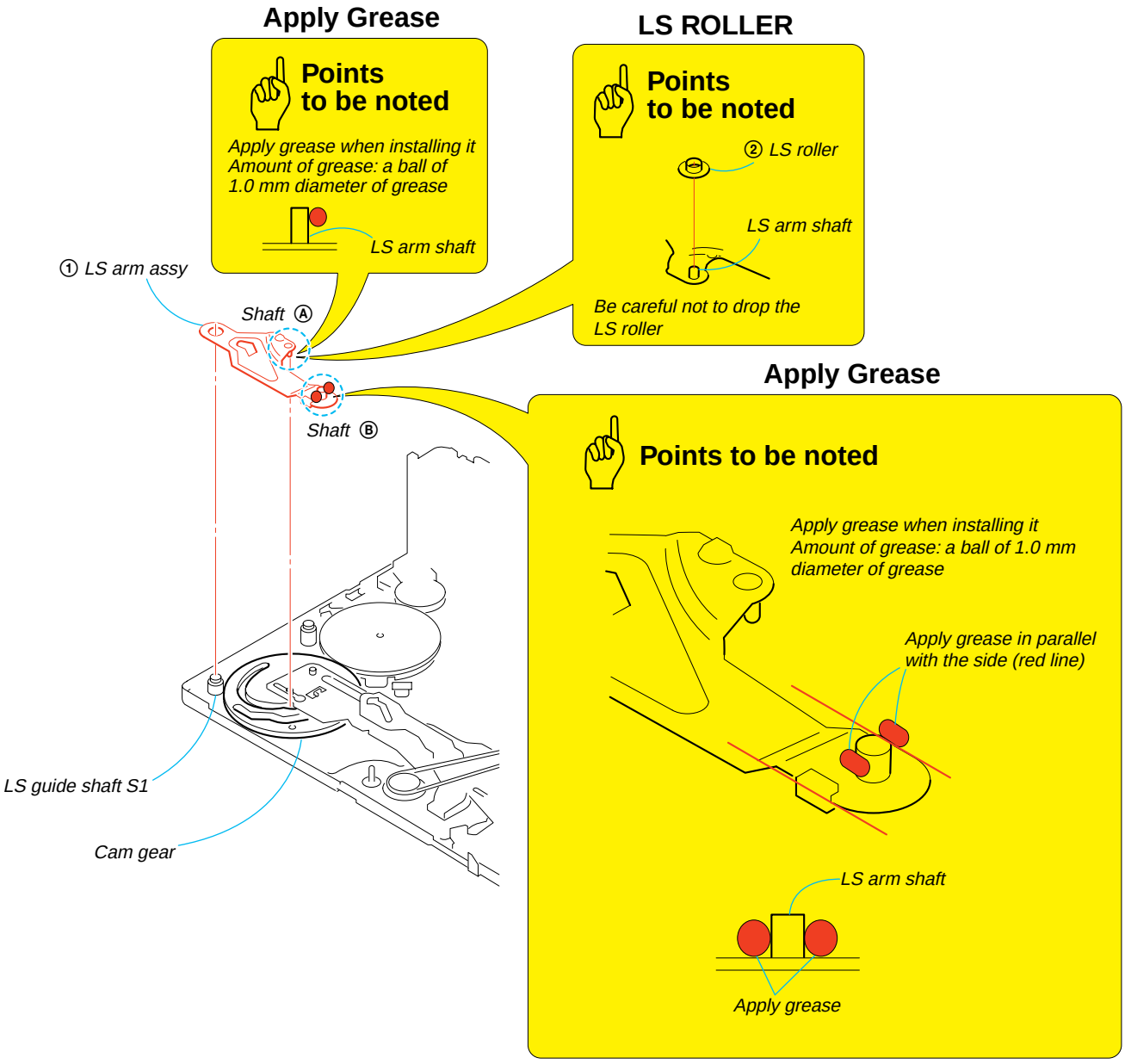
3-28. LS Arm Assy

1. Removal procedure

1) Remove the LS arm assy ① from the LS guide S1 shaft.
2) Turn over the LS arm assy and remove the LS roller ②.

2. Attachment procedure

1) Apply grease to the LS arm shaft Ⓐ (on the side).
2) Install the LS roller ② into the LS arm shaft.
3) Turn over the LS arm assy ① and install it while matching the phase of the LS guide shaft S1 and the cam gear groove.
4) Apply grease to the LS arm shaft Ⓑ (on its side).


Apply Grease
Points to be noted
Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
LS arm shaft
LS ROLLER
Points to be noted
② LS roller
LS arm shaft
Be careful not to drop the LS roller
① LS arm assy
Shaft Ⓐ
Shaft Ⓑ
Apply Grease
Points to be noted
Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
Apply grease in parallel with the side (red line)
LS arm shaft
Apply grease
LS guide shaft S1
Cam gear

3-29. M Slider Assy (1)

1. Removal procedure

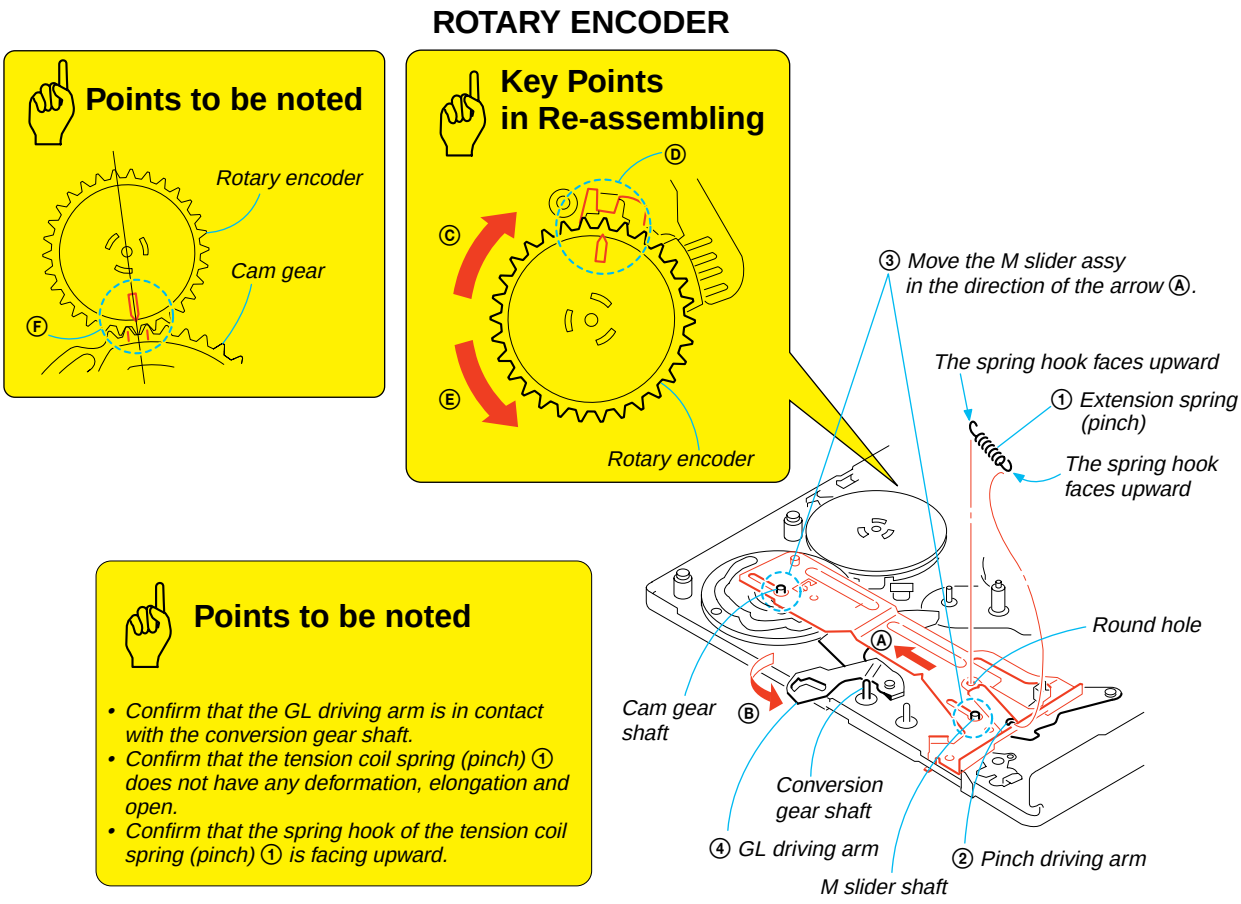
1) Remove an end of the tension spring (pinch) ① from the round hole of the M slider.
2) Remove another end of the tension spring (pinch) ① from the pinch driving arm ②.
3) Rotate the rotary encoder in the direction of the arrow Ⓔ, and align the ▲ mark of ratary encoder with the tooth bottom between second and third teeth Ⓕ. Move by hand in the direction of the arrow Ⓐ until the cam gear shaft and M slider shaft match with the shaft hole of the M slider assy ③.
4) Push in the direction of the arrow Ⓑ until the GL driving arm ④ gets in contact with the conversion gear shaft.

(to be continued to next items 5) through 7) on next page)

2. Attachment procedure

(continued from the previous items 1) through 5) on next page)

6) Move the conversion gear shaft in the direction opposite tot he arrow mark Ⓑ as far as it can go.
7) Rotate the rotary encoder in the direction of the arrow Ⓒ until the ▲ mark arrives at the position Ⓓ.
8) Install an end of the tension coil spring (pinch) ① on the pinch driving arm ② (in the way that spring hook faces upward).
9) Install another end of the tension coil spring (pinch) ① on the round hole of the M slider (in the way that spring hook faces upward).


ROTARY ENCODER
Points to be noted
Rotary encoder
Cam gear
Ⓕ
Key Points in Re-assembling
Ⓓ
Ⓒ
Ⓔ
Rotary encoder
③ Move the M slider assy in the direction of the arrow Ⓐ.
The spring hook faces upward
① Extension spring (pinch)
The spring hook faces upward
Round hole
Cam gear shaft
Ⓑ
Conversion gear shaft
④ GL driving arm
② Pinch driving arm
M slider shaft
Points to be noted
• Confirm that the GL driving arm is in contact with the conversion gear shaft.
• Confirm that the tension coil spring (pinch) ① does not have any deformation, elongation and open.
• Confirm that the spring hook of the tension coil spring (pinch) ① is facing upward.

3-30. M Slider Assy (2)

1. Removal procedure

(continued from the previous items 1) through 5) on previous page)

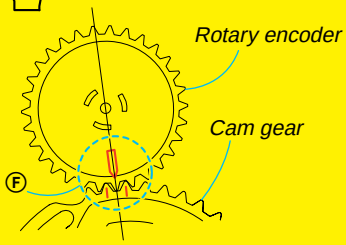
5) Remove the cam gear shaft and the M slider shaft from the two shaft holes Ⓐ of the M slider assy ①.
6) Remove the top tip Ⓑ of the M slider assy ① from the notch of the mechanical chassis in the direction of the arrow.
7) Remove the M slider assy ①.

2. Attachment procedure

1) Apply grease to the cam gear shaft and the M slider shaft (neck groove of the shaft where the M slider slides).
   Amount of grease: a ball of 1.0 mm diameter of grease
2) Align the hole of the pinch driving arm and the hole of the mechanical chassis.
3) Insert the top tip Ⓑ of the M slider assy ① into the notch of the mechanism chassis, and at the same time install the M slider assy ① into the GL driving arm.
4) Align the ▲ mark of rotary encoder with the tooth bottom between second and third teeth Ⓕ.
5) Install the cam gear shaft and the M slider shaft into the tow shaft holes Ⓐ of the M slider assy.

(to be continued to next items 6) through 9) on previous page)

Points to be noted



M SLIDER ASSY

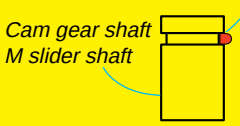
Key Points in Re-assembling

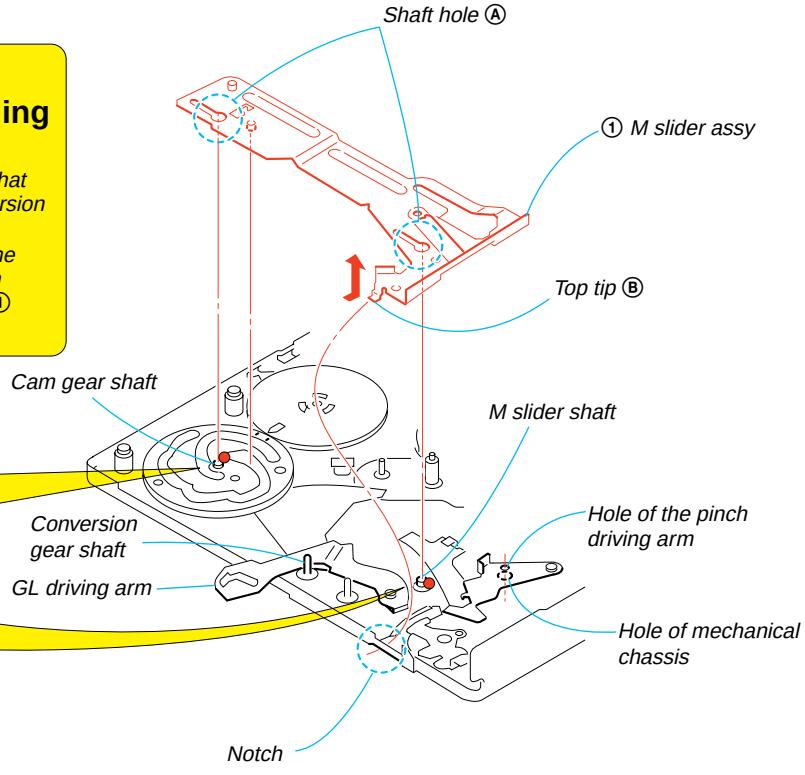
- *When installing the M slider assy ①, confirm that the GL driving arm is in contact with the conversion gear shaft.*
- *Confirm that you have not forgotten to insert the top tip Ⓑ of the M slider assy ① into the notch of the mechanical chassis. The M slider assy ① should not have any deformation.*

Apply Grease

Points to be noted

Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
Neck groove of the shaft where the M slider slides





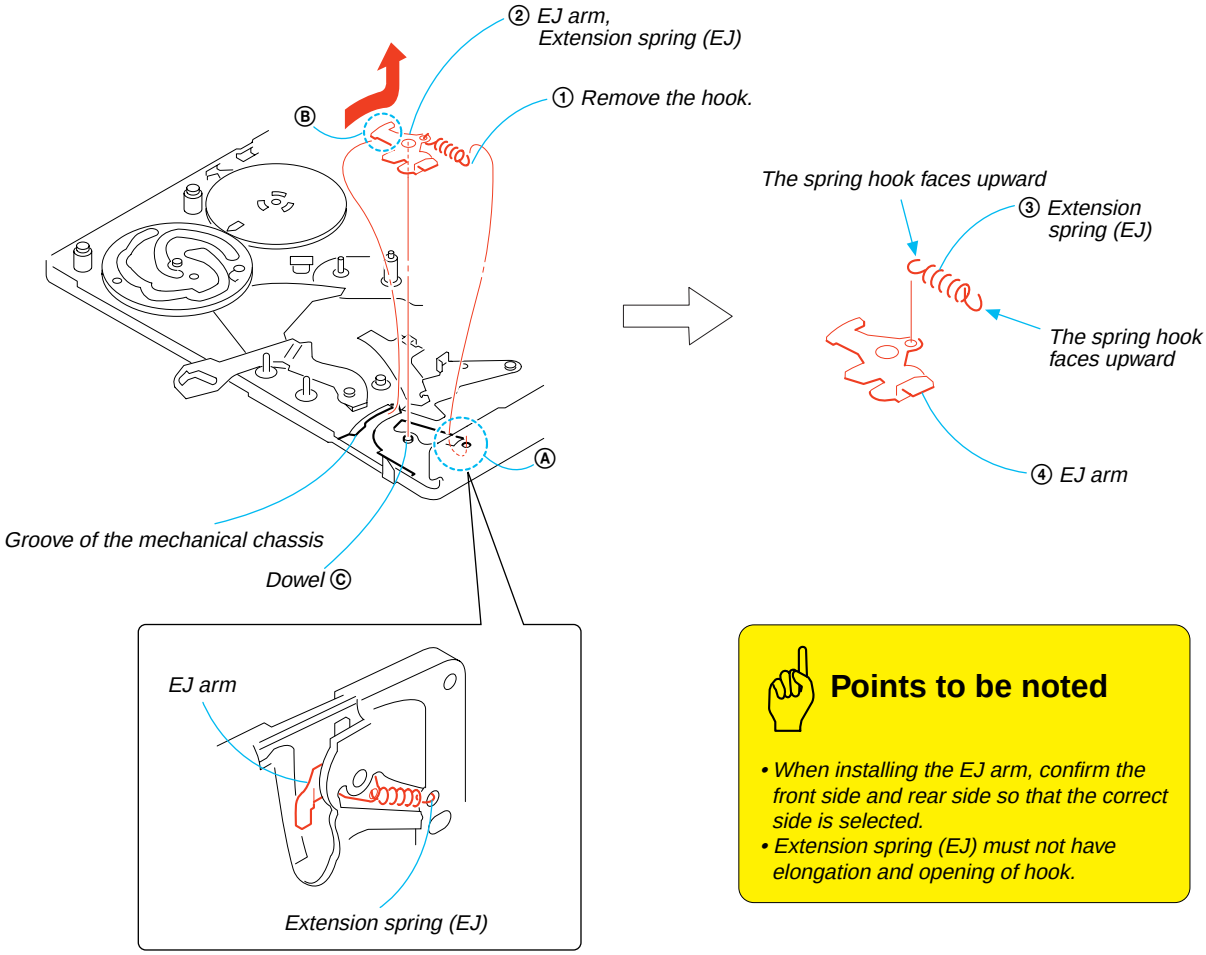
3-31. EJ Arm

1. Removal procedure

1) Remove the hook ① of the tension coil spring (EJ arm) ③ that is hooked on the round hole Ⓐ.
2) Remove the EJ arm and the tension coil spring (EJ arm) ② all together in the direction of the arrow.
3) Remove the tension coil spring (EJ arm) ③ from the EJ arm ④.

2. Attachment procedure

1) Install the tension coil spring (EJ arm) ③ into the round hole of the EJ arm ④ with the hook facing upward.
2) Insert the top tip (bent) portion Ⓑ of the EJ arm ④ into the groove of the mechanical chassis. Insert the dowel Ⓒ into the round hole of the EJ arm.
3) Insert he tension coil spring ① into the round hole Ⓐ of the mechanical chassis with the hook facing upward.



Points to be noted

- *When installing the EJ arm, confirm the front side and rear side so that the correct side is selected.*
- *Extension spring (EJ) must not have elongation and opening of hook.*

3-32. Cam Gear and GL Driving

1. Removal procedure

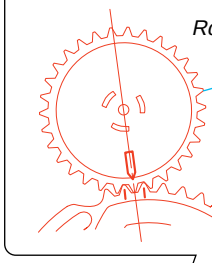
1) Rotate the GL driving arm Ⓗ block assy in the direction of the arrow Ⓘ until it contacts with the conversion gear shaft.
2) Remove the cam gear ②.
3) Remove the GL driving arm ③.

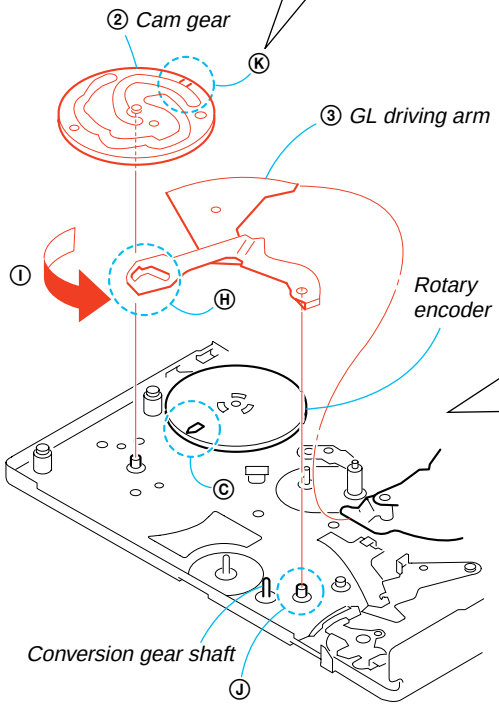
2. Attachment procedure

1) Insert the GL driving arm ③ into the shaft Ⓙ of the mechanical chassis and rotate the GL driving arm Ⓗ block assy in the direction of the arrow Ⓘ until it contacts with the conversion gear shaft.
2) Confirm the front side and rear side of the cam gear ② so that the correct side is selected. Install the cam gear ② while matching phase of the ▲ mark Ⓒ with the second tooth valley Ⓚ and the third tooth valley Ⓚ of the cam gear.
3) Apply grease to the specified locations Ⓐ to Ⓖ of the cam gear.

Matching Phase

Key Points in Re-assembling



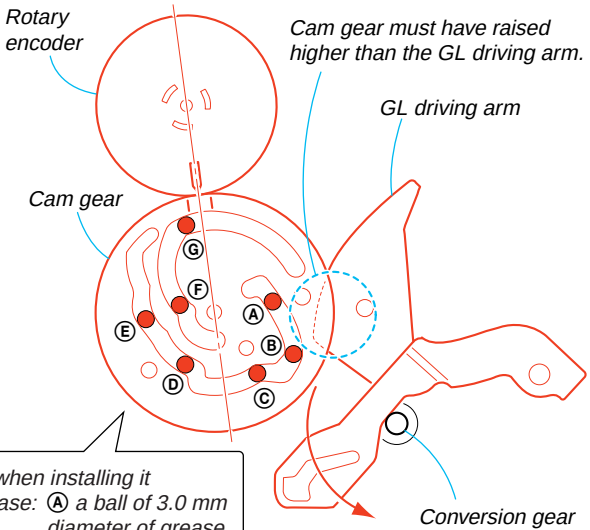


Points to be noted

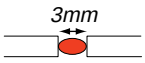
- *Confirm that the phase of the cam gear and that of the rotary encoder are matched and in phase.*
- *Confirm that the cam gear overrides on the GL driving arm.*
- *Confirm that the GL driving arm is contact with the conversion shaft.*
- *Do not apply grease to any locations other than the specified location. Apply grease of the specified amount.*

Notes When Applying Grease and During Installation

Key Points in Re-assembling



Apply grease when installing it
Amount of grease: Ⓐ a ball of 3.0 mm diameter of grease Ⓑ to Ⓖ a ball of 2.0 mm diameter of grease



Sides of the both grooves

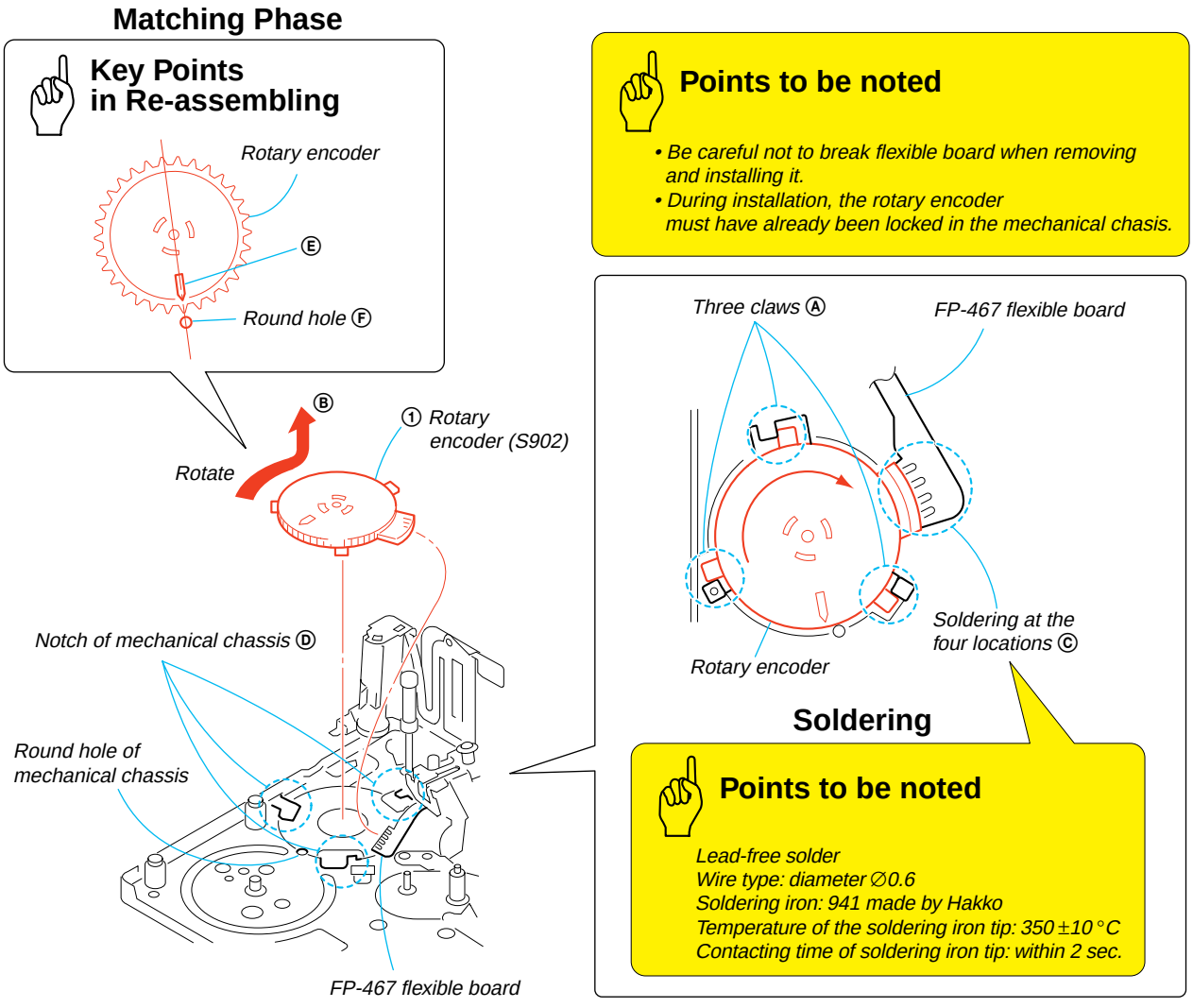
3-33. Rotary Encoder (S902)

1. Removal procedure

1) Remove the three claws Ⓐ of the rotary encoder (S902) ① from the three notches of the mechanical chassis.
2) Rotate the rotary encoder (S902) ① in the direction of the arrow Ⓑ and remove.
3) Remove soldering (at the four locations) Ⓒ to which the rotary encoder (S902) is attached.

2. Attachment procedure

1) Make soldering (at the four locations) Ⓒ so that the rotary encoder (S902) ① is connected to the FP-467 flexible board.
2) Place the rotary encoder (S902) ① on top of the notch Ⓓ of the mechanical chassis. Lock the three claws Ⓐ of the rotary encoder (S902) ① into the notches Ⓓ of the mechanical chassis.
3) Match the phase of the ▲ mark Ⓔ of the rotary encoder (S902) ① with the phase of the round hole Ⓕ of the mechanical chassis.


Matching Phase
Key Points in Re-assembling
Rotary encoder
Ⓔ
Round hole Ⓕ
Ⓑ
① Rotary encoder (S902)
Rotate
Notch of mechanical chassis Ⓓ
Round hole of mechanical chassis
FP-467 flexible board
Points to be noted
• Be careful not to break flexible board when removing and installing it.
• During installation, the rotary encoder must have already been locked in the mechanical chasis.
Three claws Ⓐ
FP-467 flexible board
Soldering at the four locations Ⓒ
Rotary encoder
Soldering
Points to be noted
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Temperature of the soldering iron tip: 350 ±10 °C
Contacting time of soldering iron tip: within 2 sec.

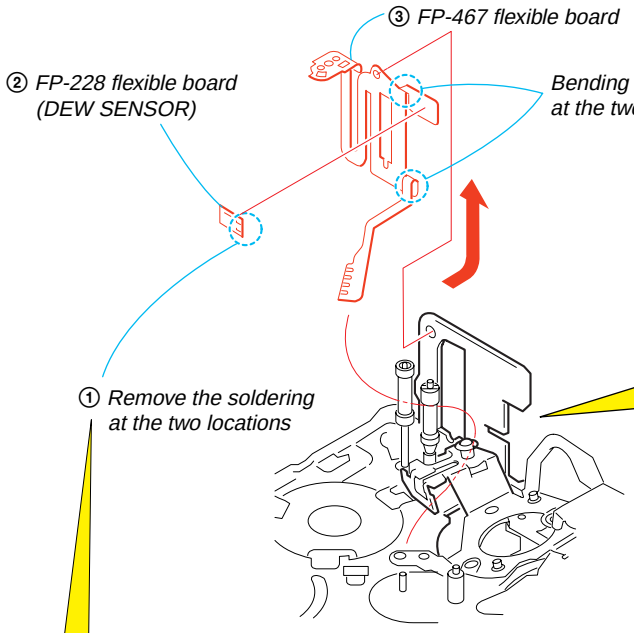
3-34. FP-228 Flexible Board (DEW SENSOR) and FP-467 Flexible Board

1. Removal procedure

1) Remove the soldering at the two locations ① and remove the FP-228 flexible board (DEW SENSOR) ②.
2) Remove the FP-467 flexible board ③ from the mechanical chassis in the direction of the arrow.

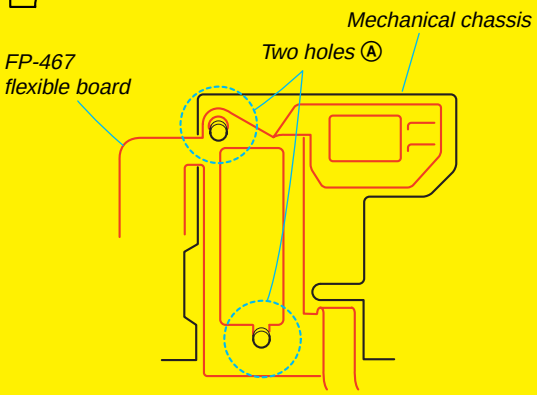
2. Attachment procedure

1) Match the phase of the two holes Ⓐ of the FP-467 flexible board ③ with the holes of the mechanical chassis, and attach them each other.
2) Attach the FP-228 flexible board (DEW SENSOR) ② to the FP-467 flexible board ③.
3) Connect the terminals at the two locations ① by soldering.


③ FP-467 flexible board
② FP-228 flexible board (DEW SENSOR)
Bending the flexible board at the two locations
① Remove the soldering at the two locations

FP-467 FLEXIBLE BOARD

Key Points in Re-assembling



Soldering

Points to be noted

Lead-free solder
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.

- *Be careful not to create the hollow soldering, Br, and there must be no lacking of parts. There must not be solder ball.*
- *Be careful not to contact the soldering iron tip too long time.*

Points to be noted

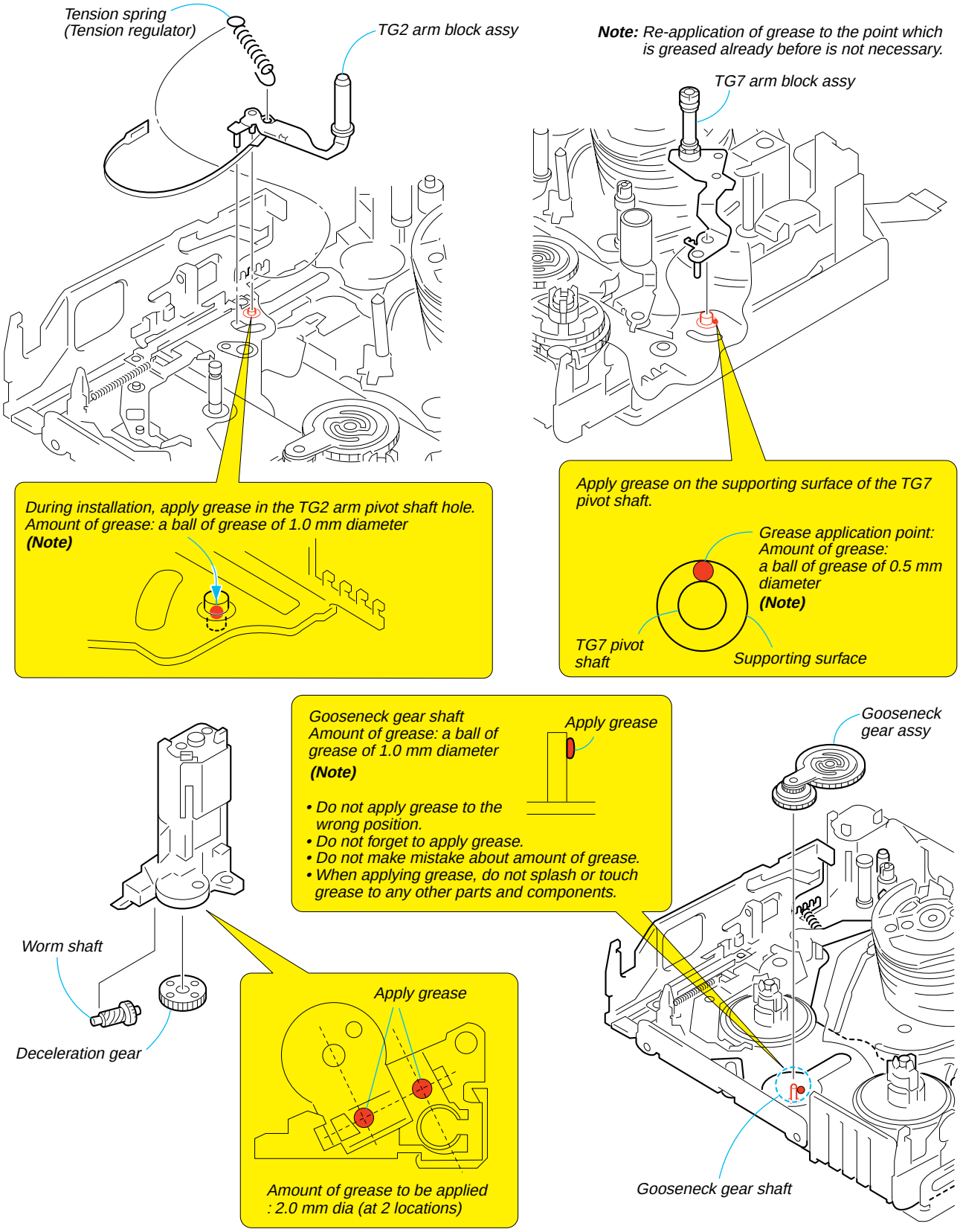
- *Be careful not to break the flexible board to have open circuit when installing and removing it.*
- *Be careful that flexible board must not override on anything.*
- *Be careful that the two bending portions of the FP-467 flexible board must not be bent excessively that results in open circuit and breakdown of flexible board.*
- *Do not rub the DEW sensor with any rubbing bars.*

2003.01.30

HELP

Application of grease, soldering method and precautions, and phase matching adjustment are compiled and below.

Apply grease (1)

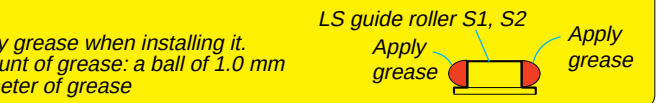

Tension spring
(Tension regulator)
TG2 arm block assy
Note: Re-application of grease to the point which is greased already before is not necessary.
TG7 arm block assy
During installation, apply grease in the TG2 arm pivot shaft hole.
Amount of grease: a ball of grease of 1.0 mm diameter
(Note)
Apply grease on the supporting surface of the TG7 pivot shaft.
Grease application point:
Amount of grease:
a ball of grease of 0.5 mm diameter
(Note)
TG7 pivot shaft
Supporting surface
Gooseneck gear shaft
Amount of grease: a ball of grease of 1.0 mm diameter
(Note)
Apply grease
• Do not apply grease to the wrong position.
• Do not forget to apply grease.
• Do not make mistake about amount of grease.
• When applying grease, do not splash or touch grease to any other parts and components.
Gooseneck gear assy
Worm shaft
Deceleration gear
Apply grease
Amount of grease to be applied
: 2.0 mm dia (at 2 locations)
Gooseneck gear shaft

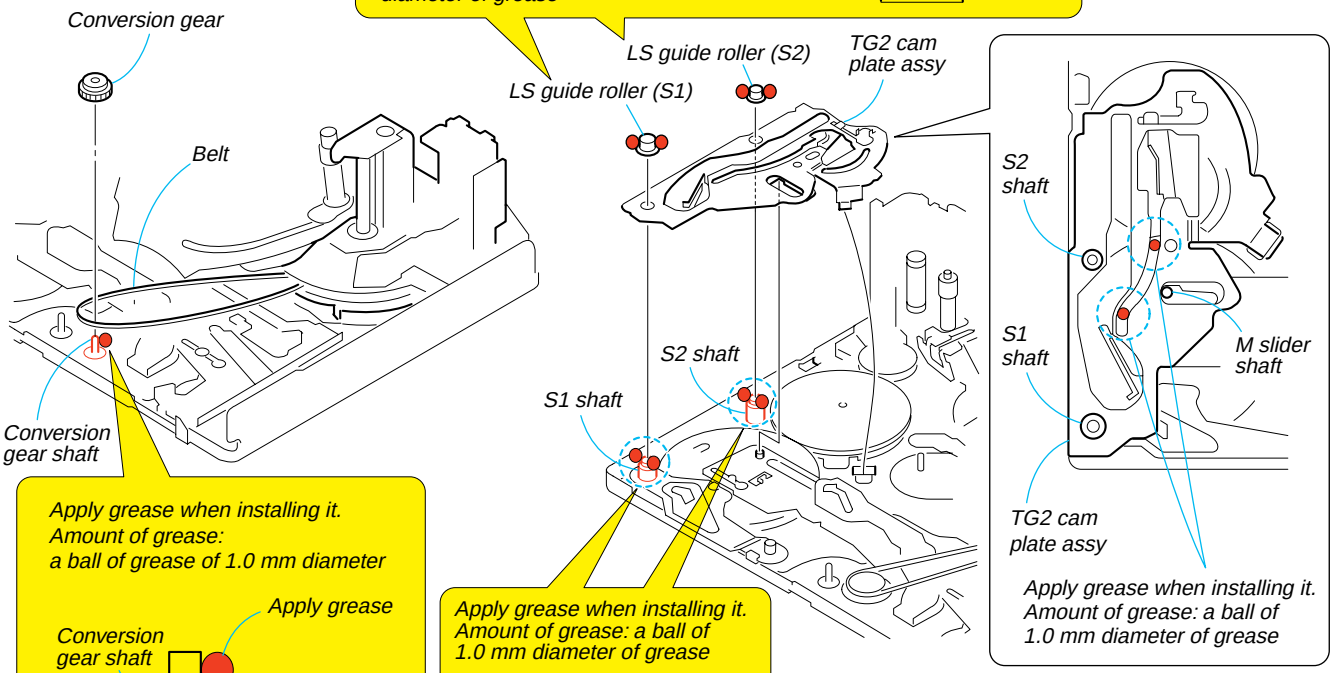
Apply grease (2)

Apply Grease

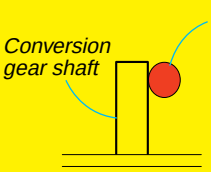
Points to be noted

Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease



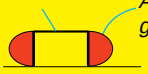


Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter



Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

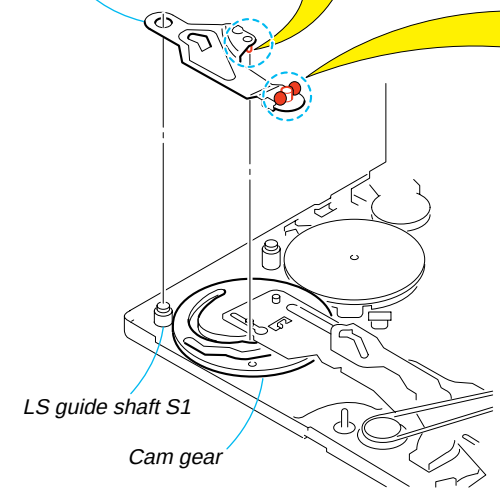
S1 shaft, S2 shaft



Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

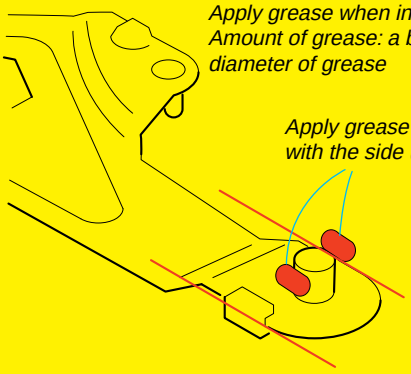
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

LS arm shaft

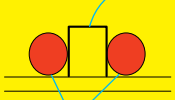


Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

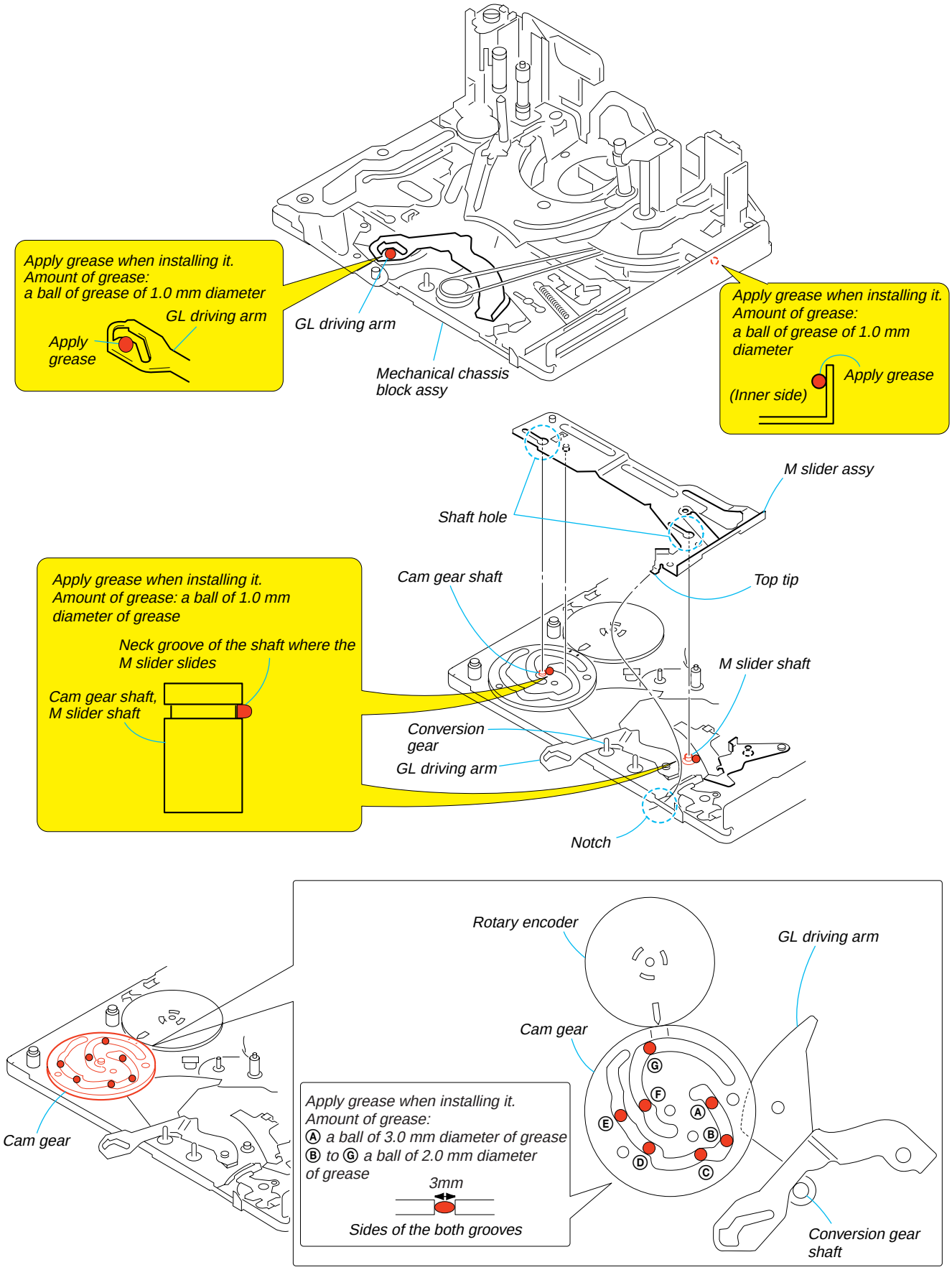
Apply grease in parallel with the side (red line)



LS arm shaft



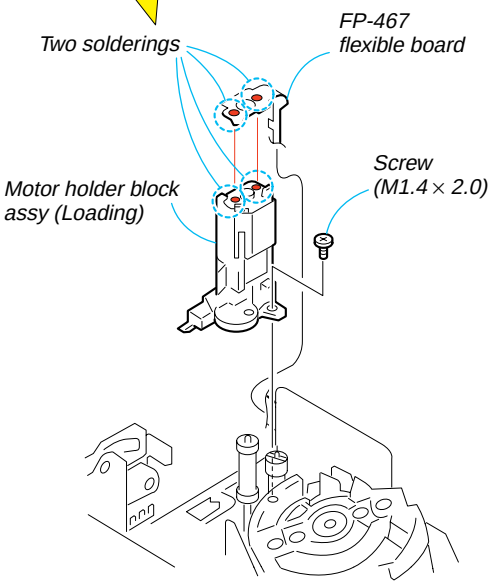
Apply grease (3)

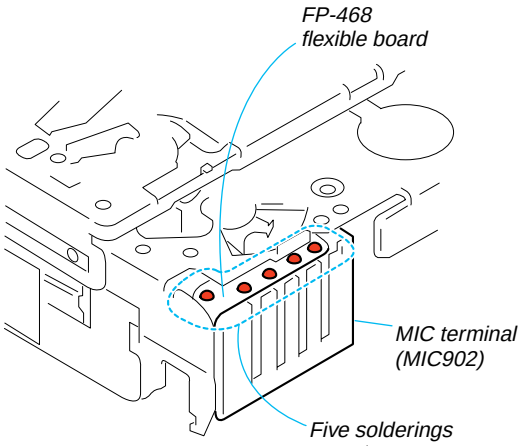

Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
GL driving arm
Apply grease
GL driving arm
Mechanical chassis block assy
Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
Apply grease
(Inner side)
M slider assy
Shaft hole
Top tip
Cam gear shaft
M slider shaft
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
Neck groove of the shaft where the M slider slides
Cam gear shaft, M slider shaft
Conversion gear
GL driving arm
Notch
Rotary encoder
GL driving arm
Cam gear
Cam gear
Apply grease when installing it.
Amount of grease:
Ⓐ a ball of 3.0 mm diameter of grease
Ⓑ to Ⓖ a ball of 2.0 mm diameter of grease
3mm
Sides of the both grooves
Conversion gear shaft

Soldering (1)

Lead-free solder
Wire type : ∅0.6
Temperature of the soldering iron tip : 320 °C
Contacting time of soldering iron tip : within 2 sec.

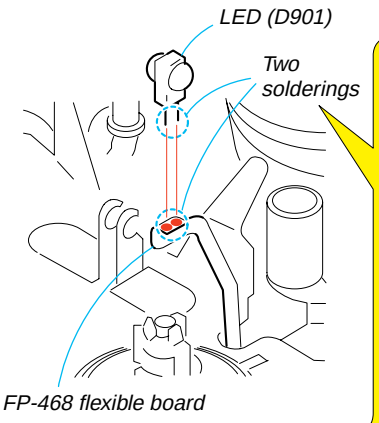
- Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
- Be careful not to melt the detent of the holder.
- Be careful not to melt the END cover.
- Be careful not to break the terminals due to attaching the soldering iron too long time.



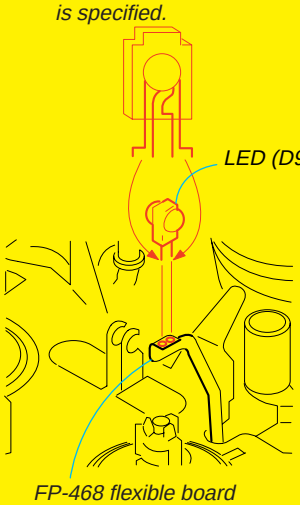


Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

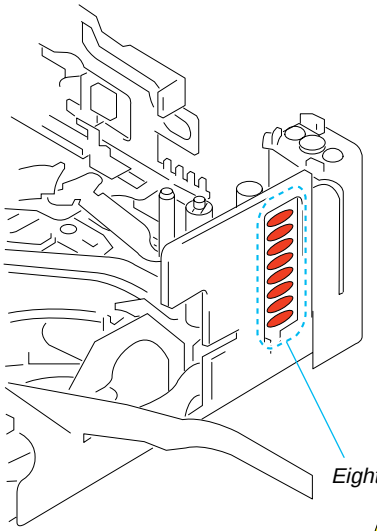
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec



Direction of the terminal is specified.



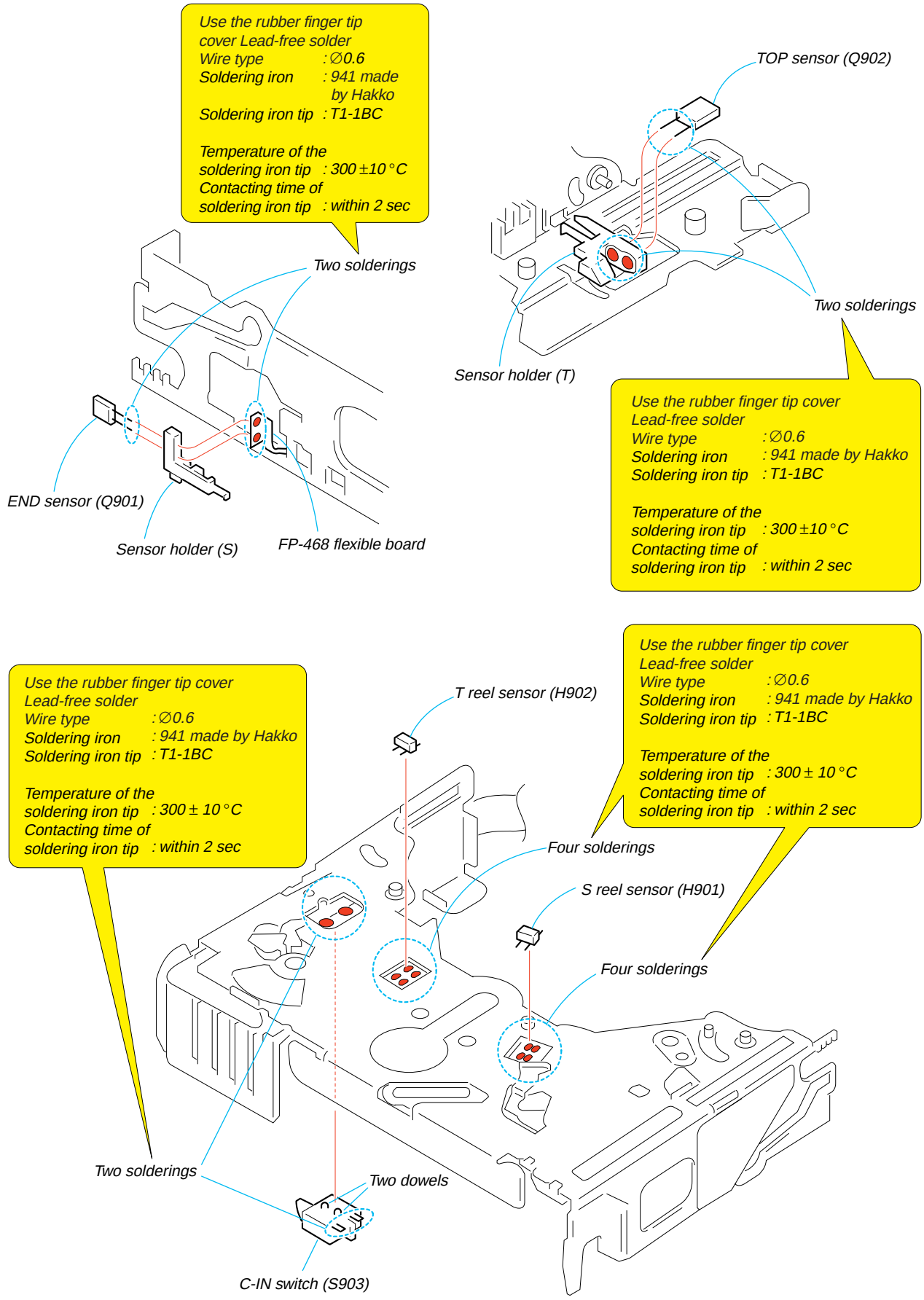
Rubber finger tip protection cover must be used.
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Soldering iron tip: T1-1BC
Temperature of the soldering iron tip: 300 ±10 °C
Contacting time of soldering iron tip: within 2 sec.



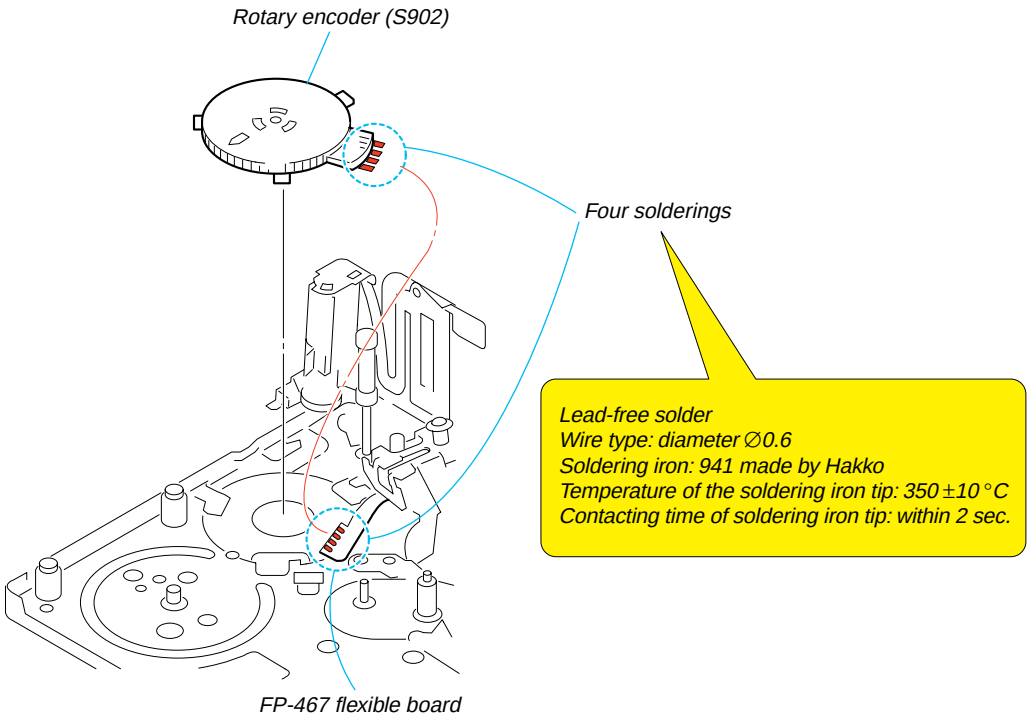
Lead-free solder
Wire type: diameter 0.6 ∅
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.

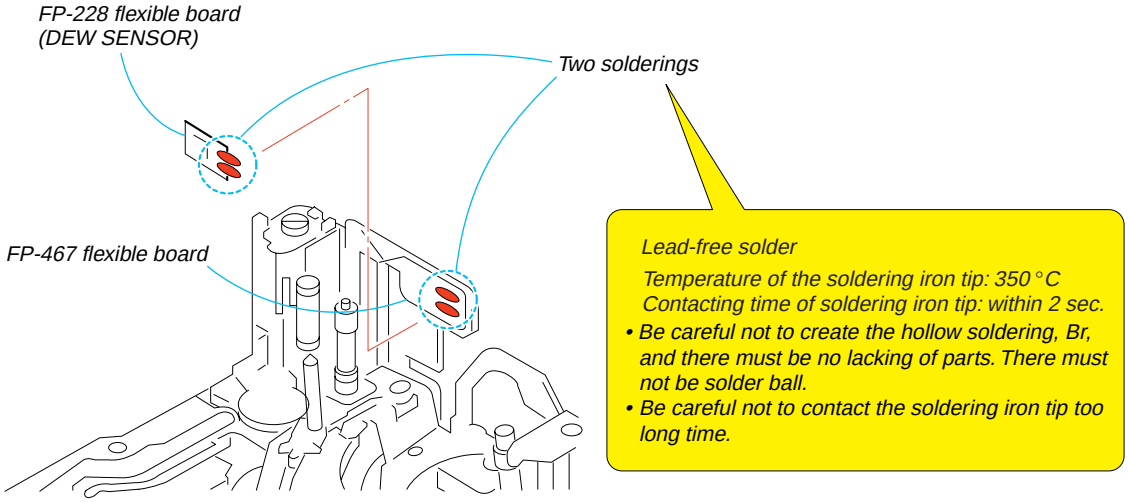
- Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
- Be careful not to crash the grip jog to the TG1 guide.

Soldering (2)

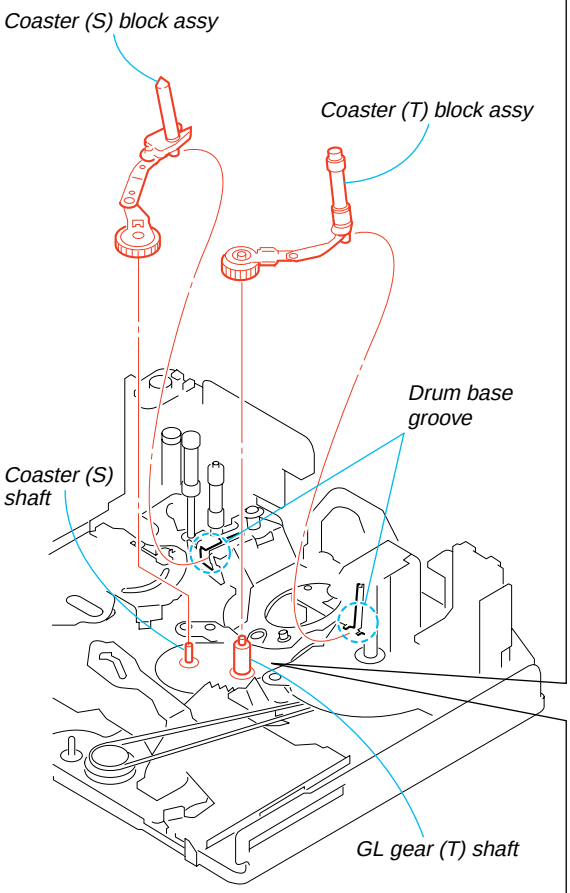

Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec
Two solderings
END sensor (Q901)
Sensor holder (S)
FP-468 flexible board
TOP sensor (Q902)
Two solderings
Sensor holder (T)
Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec
Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ± 10 °C
Contacting time of soldering iron tip : within 2 sec
T reel sensor (H902)
Four solderings
S reel sensor (H901)
Four solderings
Two solderings
Two dowels
C-IN switch (S903)

Soldering (3)

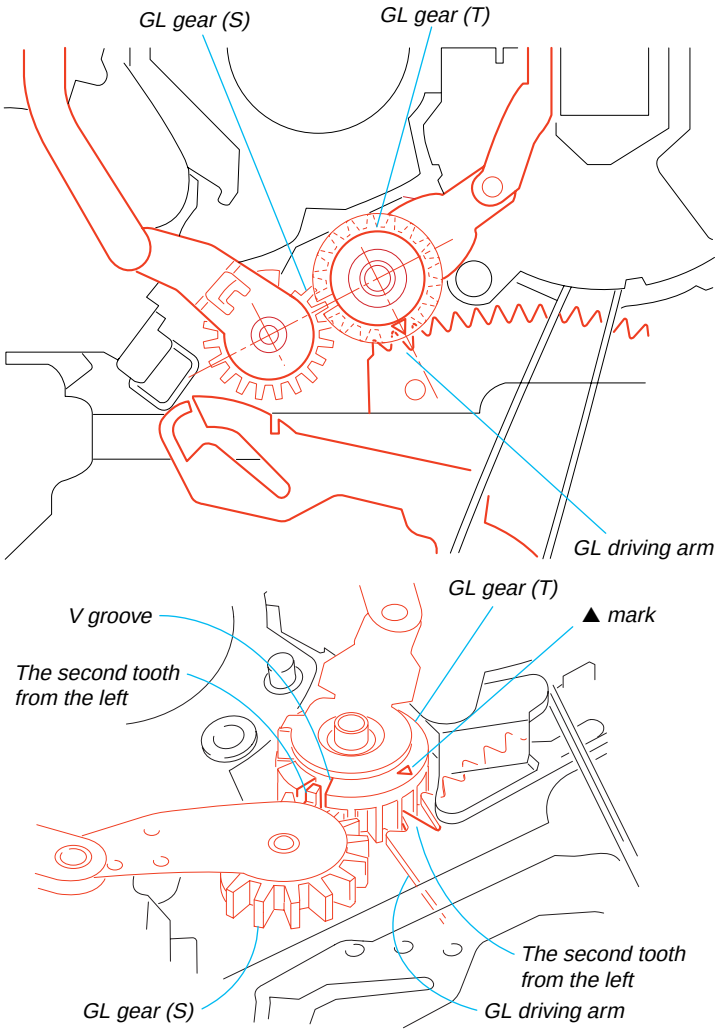

Rotary encoder (S902)
Four solderings
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Temperature of the soldering iron tip: 350 ±10 °C
Contacting time of soldering iron tip: within 2 sec.
FP-467 flexible board


FP-228 flexible board
(DEW SENSOR)
Two solderings
FP-467 flexible board
Lead-free solder
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.
• Be careful not to create the hollow soldering, Br, and there must be no lacking of parts. There must not be solder ball.
• Be careful not to contact the soldering iron tip too long time.

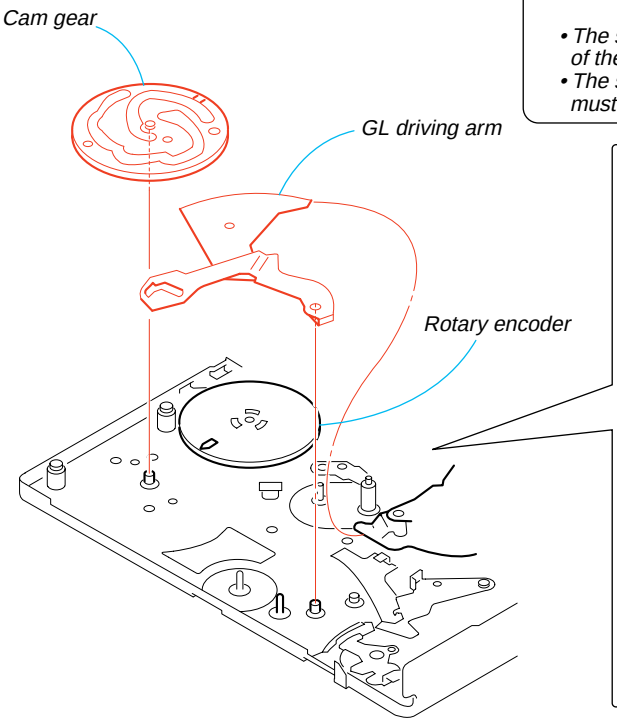
Matching Phase

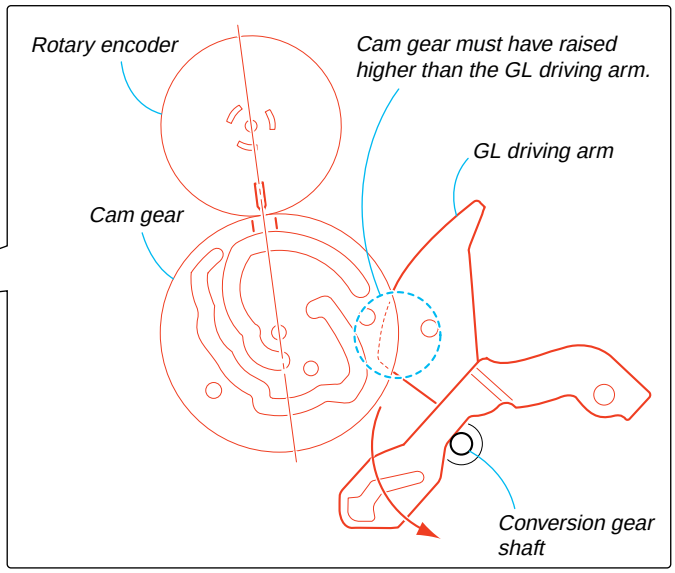


When re-assembling, adjust the gear phase at the three positions.



- The second tooth from the left of the GL gear (S) and the V-groove of the GL gear (T) must be in phase.
- The second tooth from the left of the GL drive arm and the ▲ mark must be in phase.





4. Adjustment

4-1. FWD Position Adjustment

When the TG2 arm block assy or the band adjuster or the S reel table assy is replaced or removed, the following adjustment becomes necessary.

- TG2 FWD Position Adjustment (Refer to section 4-4.)
- FWD Back Tension Adjustment (Refer to section 4-4.)
- Reel Table (RVS) Check (Refer to section 4-2.)

1) Set the R/P mode and check the TG2 guide position as follows.
   - Confirm that the distance between the TG2 guide and the L motor is 1.0 mm. If not, perform adjustment as follows.
2) Loosen the fixing screw. Use the adjustment screwdriver (Ref No. J-8) and adjust the band adjuster for the distance of 1.0 mm between the TG2 guide and the L motor. Upon completion of adjustment, tighten the fixing screw securely as follows.
   Tightening torque: 0.059 ± 0.01 N•m (0.6 ± 0.1 kgf•cm)
   Note: Upon completion of adjustment, confirm that TG2 can move with some margin in the direction of the arrow Ⓐ.

4-2. Reel Torque Check

1. Check Procedure

[FWD torque]

1) Set the mini DV torque cassette (Ref. No. J-6).
2) Establish the FWD mode. Confirm that the center value of the T reel table torque value is in the range of 0.49 to 0.93 (mN•m) (5.0 to 9.5 g•cm) within deviation of 0.39 (mN•m) (4.0 g•cm)

[RVS torque]

1) Set the mini DV torque cassette (Ref. No. J-6).
2) Establish the RVS mode. Confirm that the center value of the S reel table torque value is in the range of 1.57 to 2.45 (mN•m) (16.0 to 25.0 g•cm)

If the above specification is not satisfied, check the tension regulator band for correct operation. If operation of the tension regulator band has no problem, replace the respective reel tables.

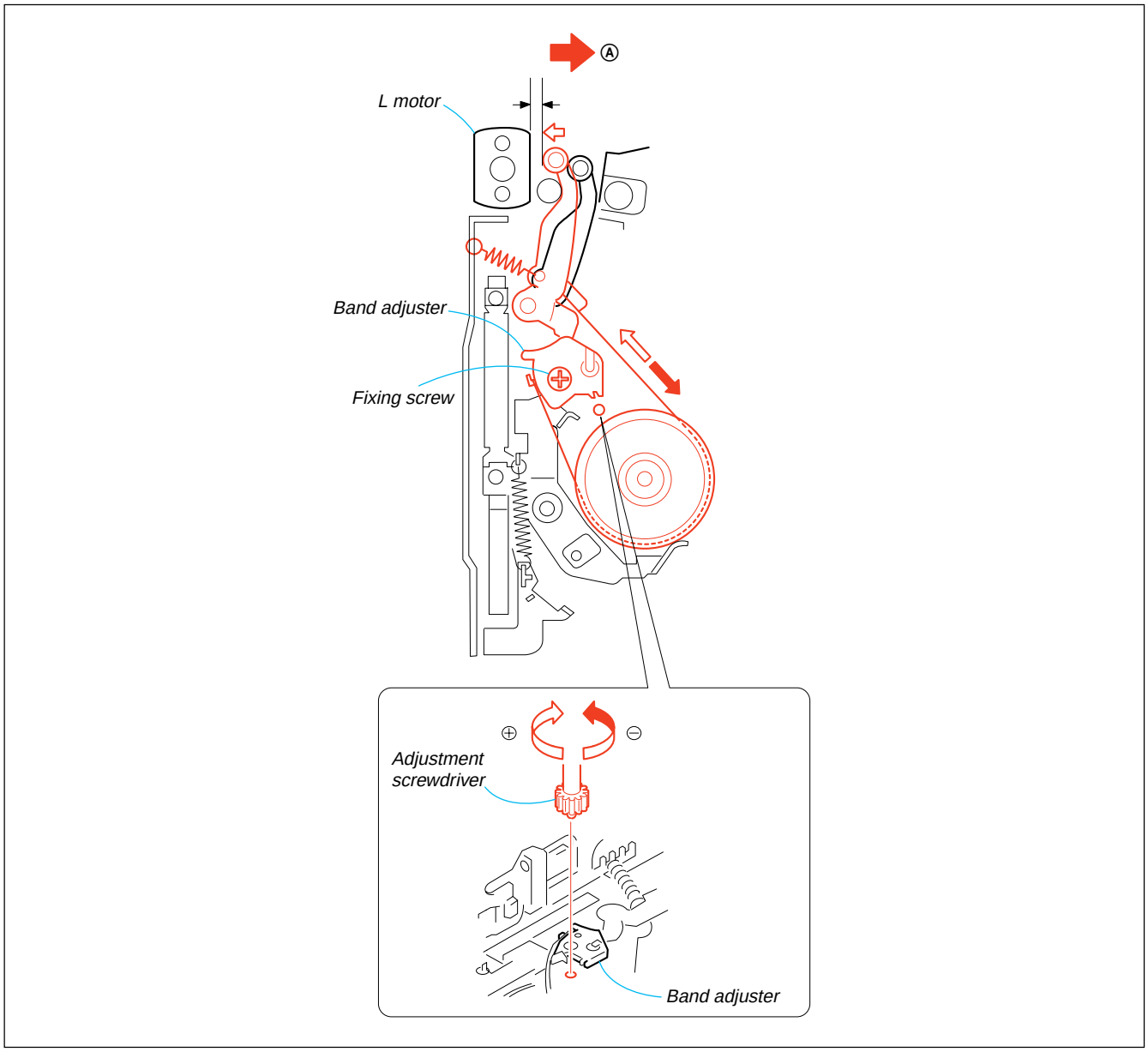


Fig. 4-1

4-3. LS Cam Plate Position Adjustment

1. Adjustment Procedure

1) Loosen the LS cam plate fixing screw (special head screw M1.4 × 1.4) by 180 degrees.
2) Set the STOP mode.
3) While pressing the center of the LS chassis block with the force of 1.5 ± 0.5 N (150 gf ± 50 gf), move the LS cam plate toward the S reel side with the force of 0.147 ± 0.01 N•m (2300 gf ± 200 gf) and tighten the LS cam plate fixing screw (special head screw M1.4 × 1.4) ①.
   Tightening torque: 0.098 ± 0.01 N•m (1.0 ± 0.1 kgf•cm)

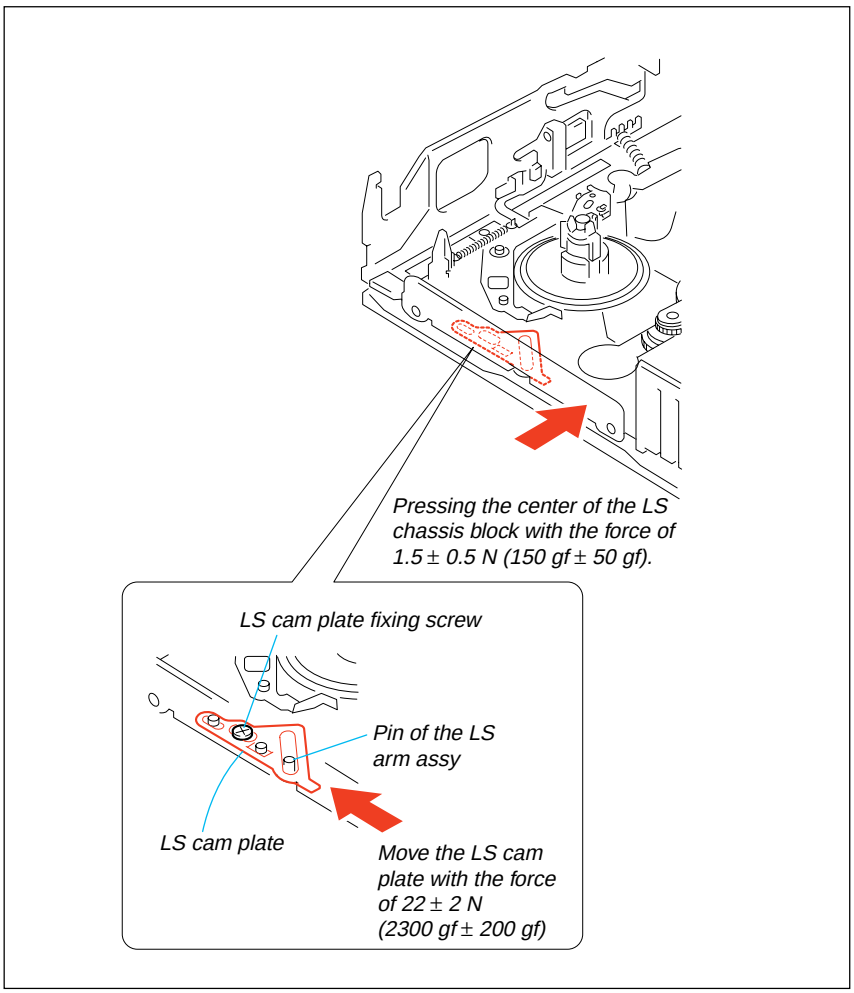

Pressing the center of the LS chassis block with the force of 1.5 ± 0.5 N (150 gf ± 50 gf).
LS cam plate fixing screw
Pin of the LS arm assy
LS cam plate
Move the LS cam plate with the force of 22 ± 2 N (2300 gf ± 200 gf)

Fig. 4-2

4-4. Tape Path Adjustment

4-1. Adjustment Preparation

1) Clean the tape running surface (tape guides, drum, capstan, pinch roller) referring to section 2-2.
2) Connect the adjustment remote commander (Ref. No. J-13) to the LANC terminal of the machine. Set the HOLD switch to ON.
3) Connect an oscilloscope to CN1004 of the VC-312 board via the CPC-7 jig (J-6082-382-A). (In the case of DCR-TRV22K)
   Oscilloscope CH1: VC-312 board CN1004 pin② (Note 1)
   EXT. TRIG: VC-312 board CN1004 pin④
   Note 1: Connect CN1004 pin② and pin⑥ (GND) with a 75-ohm resistor (1-247-804-11).
4) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
5) Select page: 0, address: 10 and set data: 00. (Note 2)
6) Select page: 3, address: 26 and set data: 31, and press the PAUSE button. (Note 2)
7) Select page: 3, address: 33 and set data: 08. (Note 2)
8) Confirm that the RF waveform on the scope is flat at both of the entrance side and the exit side. (Refer to Fig. 4-4A.)
   If the RF waveform is not flat either at the entrance side or the exit side (refer to Fig. 4-4 B and C), perform the adjustment of section 6-2 and later.
9) When the required conditions of step 8) are satisfied, perform [Required Work upon Completion of Adjustment] as described below upon completion of adjustment/check.

[Required Work upon Completion of Adjustment]

1) Connect the adjustment remote commander (Ref. No. J-13) to the LANC terminal of the machine. Set the HOLD switch to ON.
2) Select page: 0, address: 10 and set data: 00. (Note 2)
3) Select page: 3, address: 26 and set data: 00, and press the PAUSE button. (Note 2)
4) Select page: 3, address: 33 and set data: 00. (Note 2)
   Note 2: Page and address numbers differ depending on each model. Please to Service Manual of the respective models. Page and address numbers of DCR-TRV22K are shown in this manual.

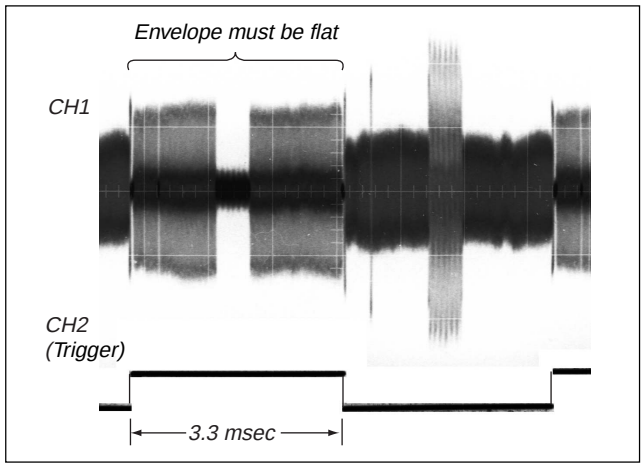


Fig. 4-3

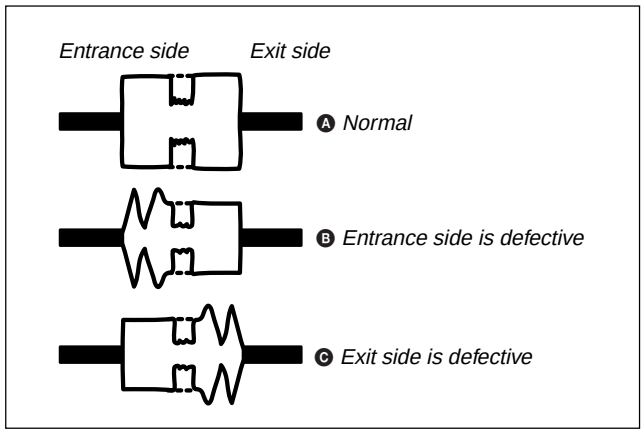


Fig. 4-4

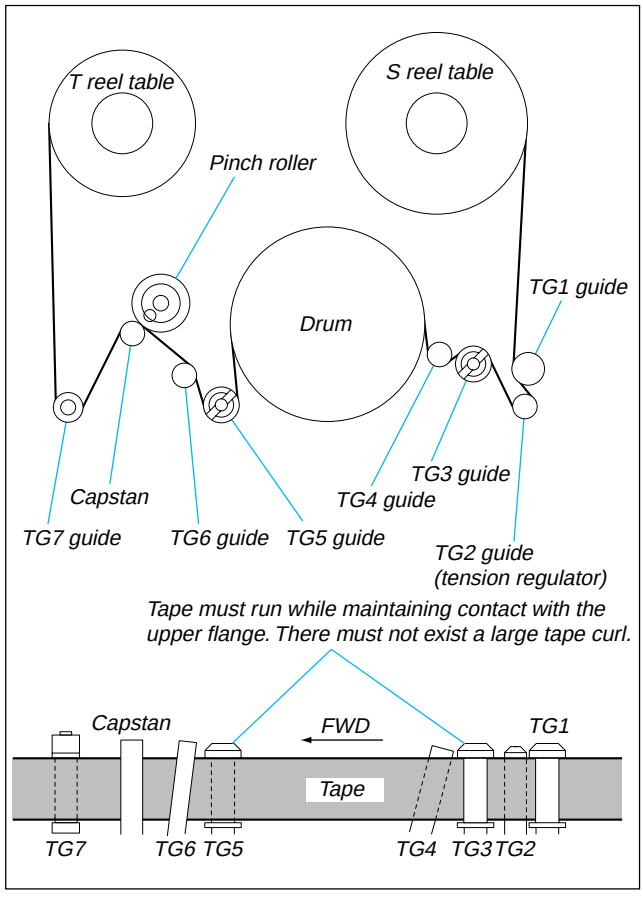


Fig. 4-5

4-2. TG3/TG5 Guide Coarse Adjustment

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Adjust the TG3 and TG5 guides until the RF envelope waveform becomes flat. (Refer to Fig. 4-8.)

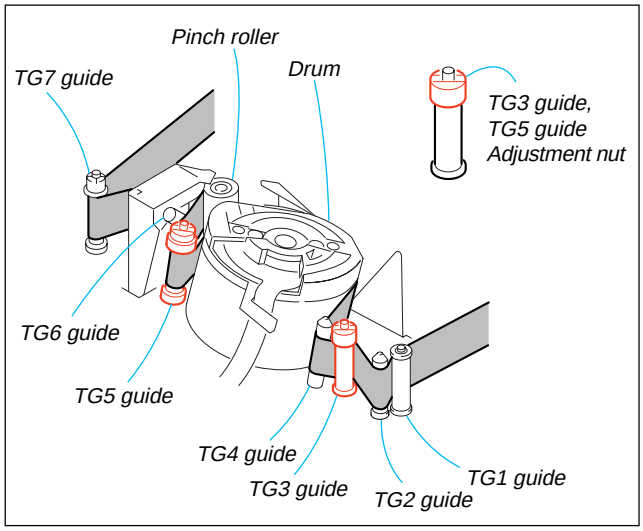


Fig. 4-6

4-3. FWD Back Tension Adjustment

1) Set the mini DV torque cassette (Ref. No. J-6) and establish the FWD mode.
2) Confirm that the S side torque cassette reading value is in the range of 0.2 to 0.3 mN•m (2.0 to 3.0 g•cm) including deviation. If the measurement value does not satisfy the specifications, perform the following adjustment.
   - If the measurement value is higher than the specification: (Decreases the spring tension)
     Move the tension coil spring hook to another spring stay in the direction of Ⓑ.
   - If the measurement value is lower than the specification: (Increases the spring tension)
     Move the tension coil spring hook to another spring stay in the direction of Ⓐ.

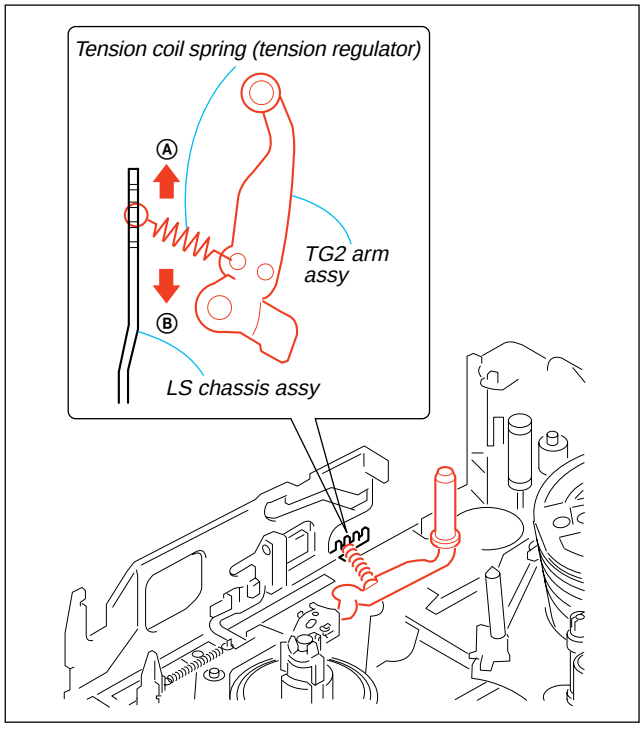


Fig. 4-7

4-4. TG3/TG5 Guide Fine Adjustment

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Adjust the TG3 so that the RF envelope has the larger amplitude at the entrance side first, than adjust TG3 guide for flat amplitude. (Refer to Fig. 4-8.)
3) Adjust the TG5 so that the RF envelope has the larger amplitude at the exit side first, than adjust TG5 guide for flat amplitude. (Refer to Fig. 4-9.)

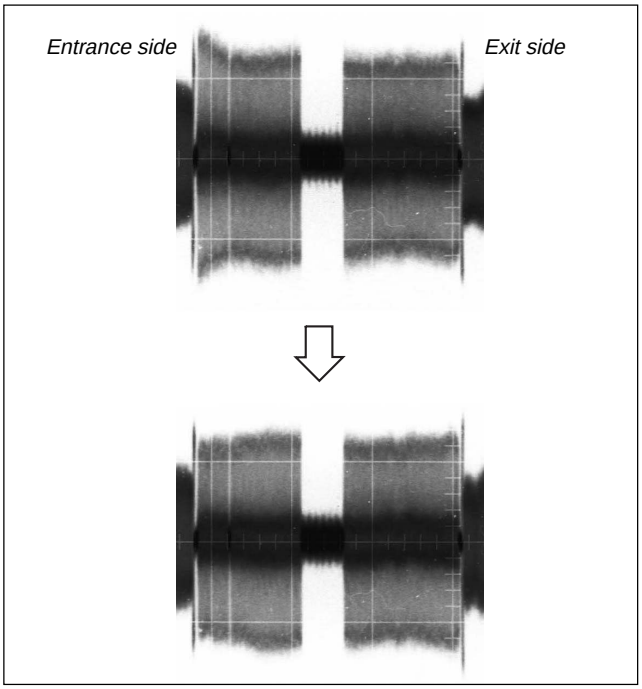


Fig. 4-8

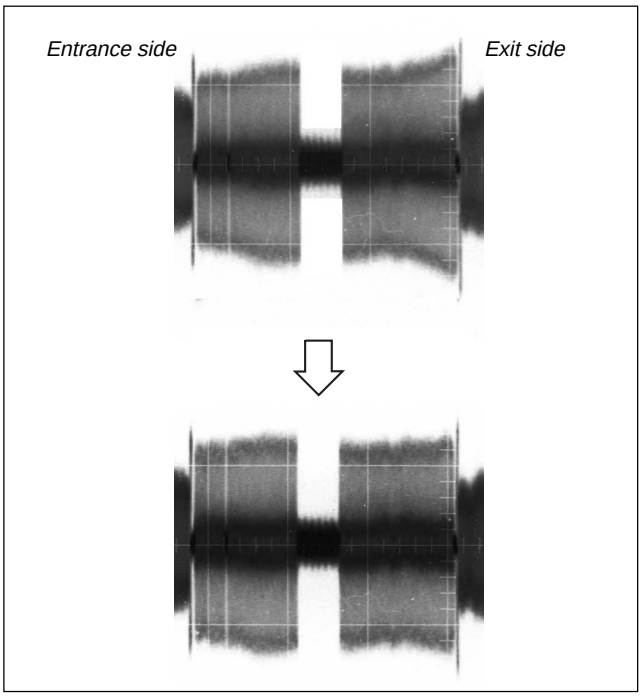


Fig. 4-9

4-5. Tape Run Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5). Establish the CUE mode first then the REV mode. Confirm in the respective modes that there are no large tape curls at the upper flange of TG3 and TG5. Then confirm in the respective modes that there are no large tape curls at the upper and lower flanges of TG1 and TG7.

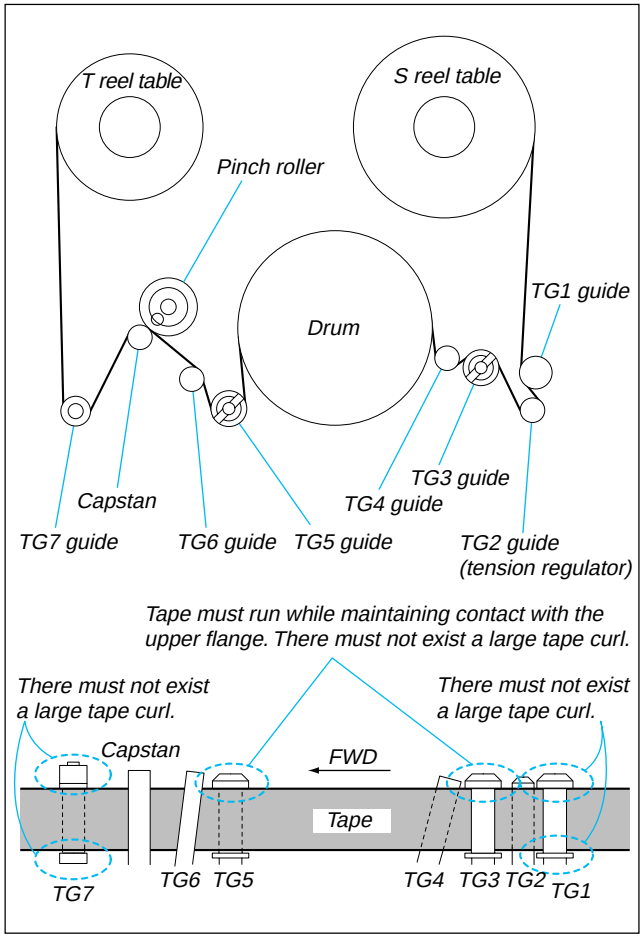


Fig. 4-10

4-6. Check upon Completion of Adjustment

1. Tracking Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Establish the CUE (or REV) mode. Take the amplitude (A) in this mode as the 100% waveform amplitude. (Refer to Fig. 4-11.)
3) Establish the FWD mode. Confirm that the difference between the minimum (E min) and the maximum (E max) is less than 30%. (When taking the amplitude (A) in the CUE or REV mode as 100%)

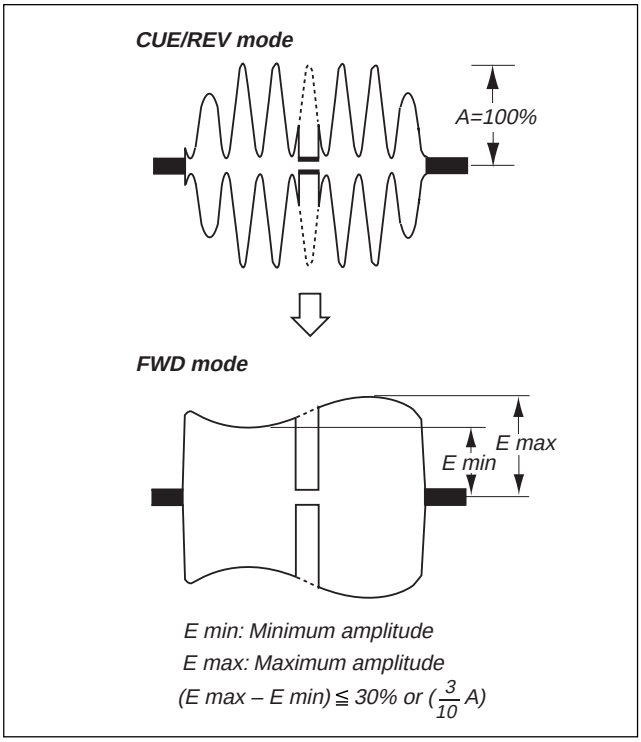


Fig. 4-11

4) Confirm that the RF waveform does not have excessive fluctuation of amplitude. (Fluctuation of amplitude should be 10% or less at both entrance side (B) and exit side (C), when taking the amplitude (A) in the CUE or REV mode as 100%)

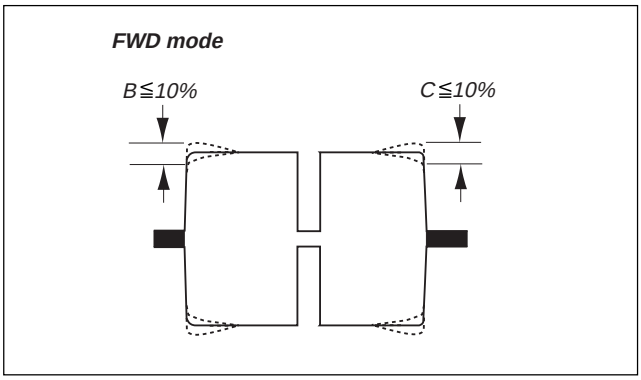


Fig. 4-12

2. CUE/REV Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Establish the CUE mode. Confirm that the pitches between the peaks of the RF waveform are equally spaced. Also confirm that the RF waveform amplitude at entrance side (B) and exit side (C) is 50% or more respectively, when taking the amplitude (A) in the CUE or REV mode as 100%.
3) Establish the REV mode. Confirm that the pitches between the peaks of the RF waveform are equally spaced. Also confirm that the RF waveform amplitude at entrance side (B) and exit side (C) is 50% or more respectively.

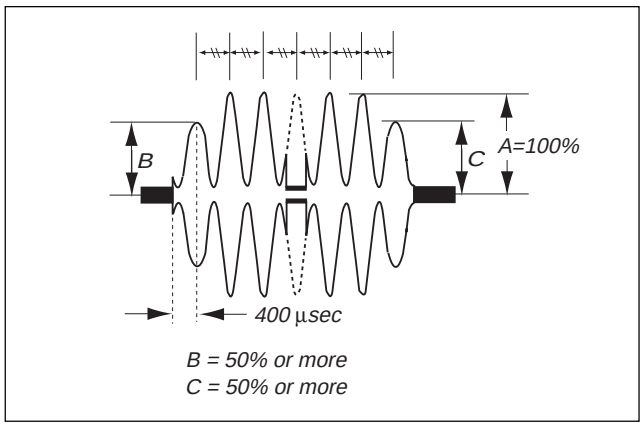


Fig. 4-13

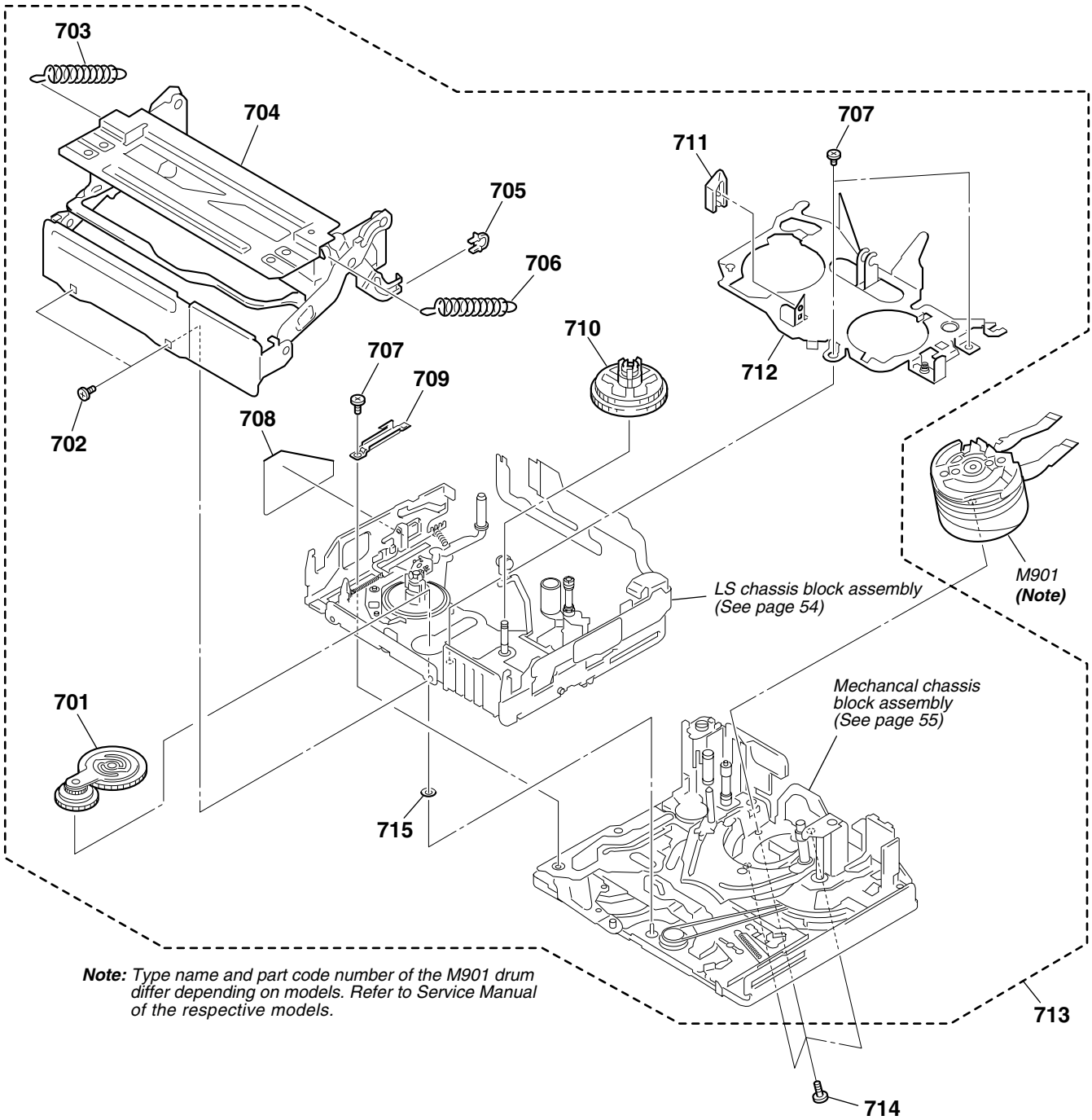
3. Rise-up Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Change the modes from CUE mode to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from CUE mode to FWD.
3) Change the modes from REV mode (two seconds or more of REV and to the FWD within five seconds) to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from REV mode to FWD.
4) Change the modes from STOP mode to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from STOP mode to FWD.

5. Exploded Views

NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

5-1. Overall Mechanism Deck Section (Z100)

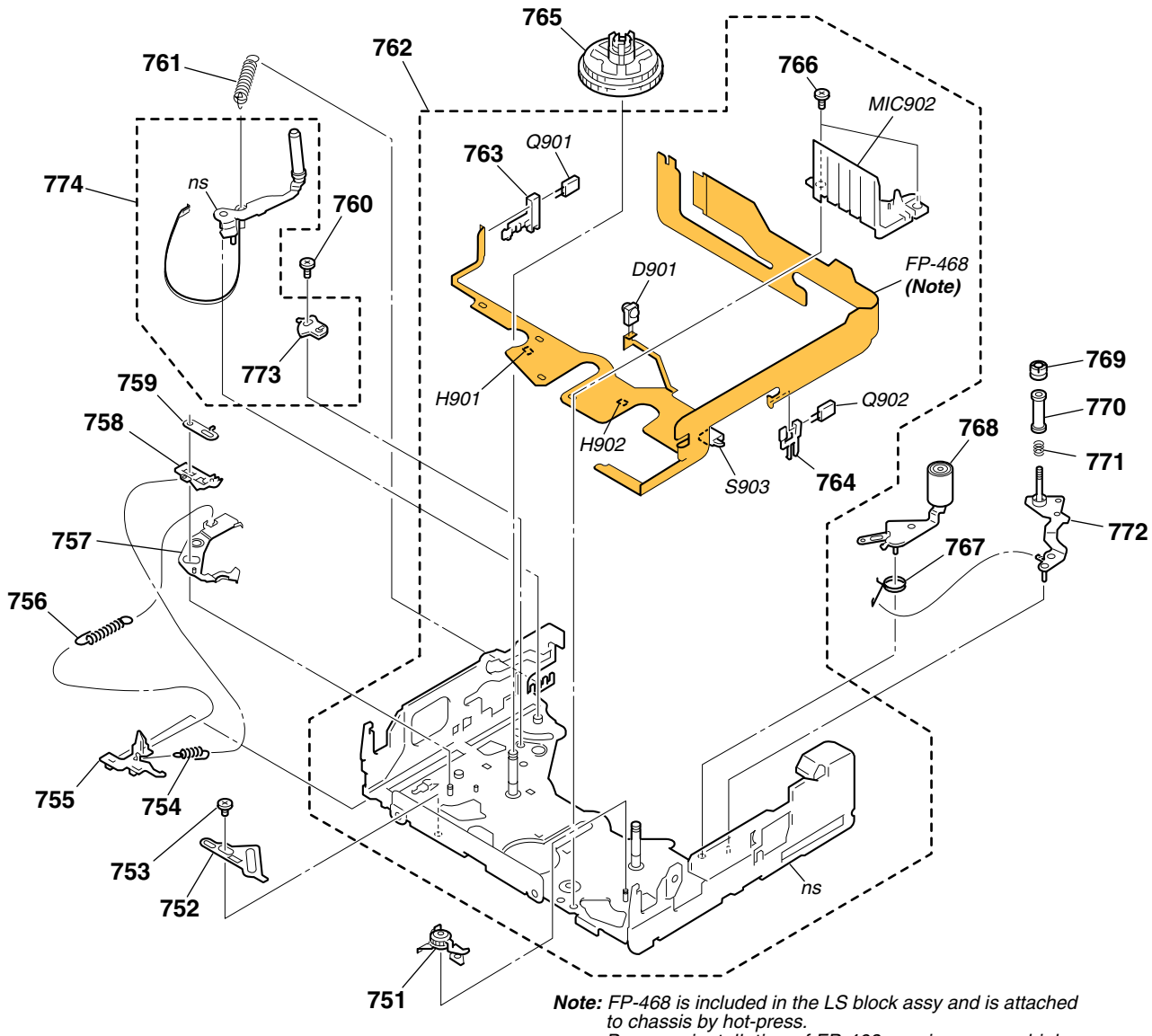


Note: *Type name and part code number of the M901 drum differ depending on models. Refer to Service Manual of the respective models.*

Ref. No.	Part No.	Description
701	X-3952-938-3	GEAR ASSY, GOOSENECK
702	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
703	3-079-206-02	SPRING (POP UP S), EXTENSION
704	X-3952-939-3	COMPARTMENT ASSY, CASSETTE
705	3-079-367-01	DAMPER, CASSETTE COMPARTMENT
706	3-079-215-02	SPRING (POP UP T), EXTENSION
707	3-703-816-15	SCREW (M1.4), SPECIAL HEAD
708	3-080-545-01	COVER, SENSOR S
709	3-079-364-01	RETAINER, LS GUIDE
710	X-3952-937-1	TABLE ASSY, T REEL
711	3-079-366-01	RELEASE, REEL LOCK
712	X-3953-257-1	PLATE ASSY, RETAINER
713	A-7095-393-A	MD (Z100) SUB ASSY
714	3-079-741-02	SCREW,DRUM FIXING
715	3-748-682-01	WASHER,T
M901	– Note –	DRUM (DEH-30A-R)(SERVICE)

5-2. LS Chassis Block Assembly

ns : not supplied



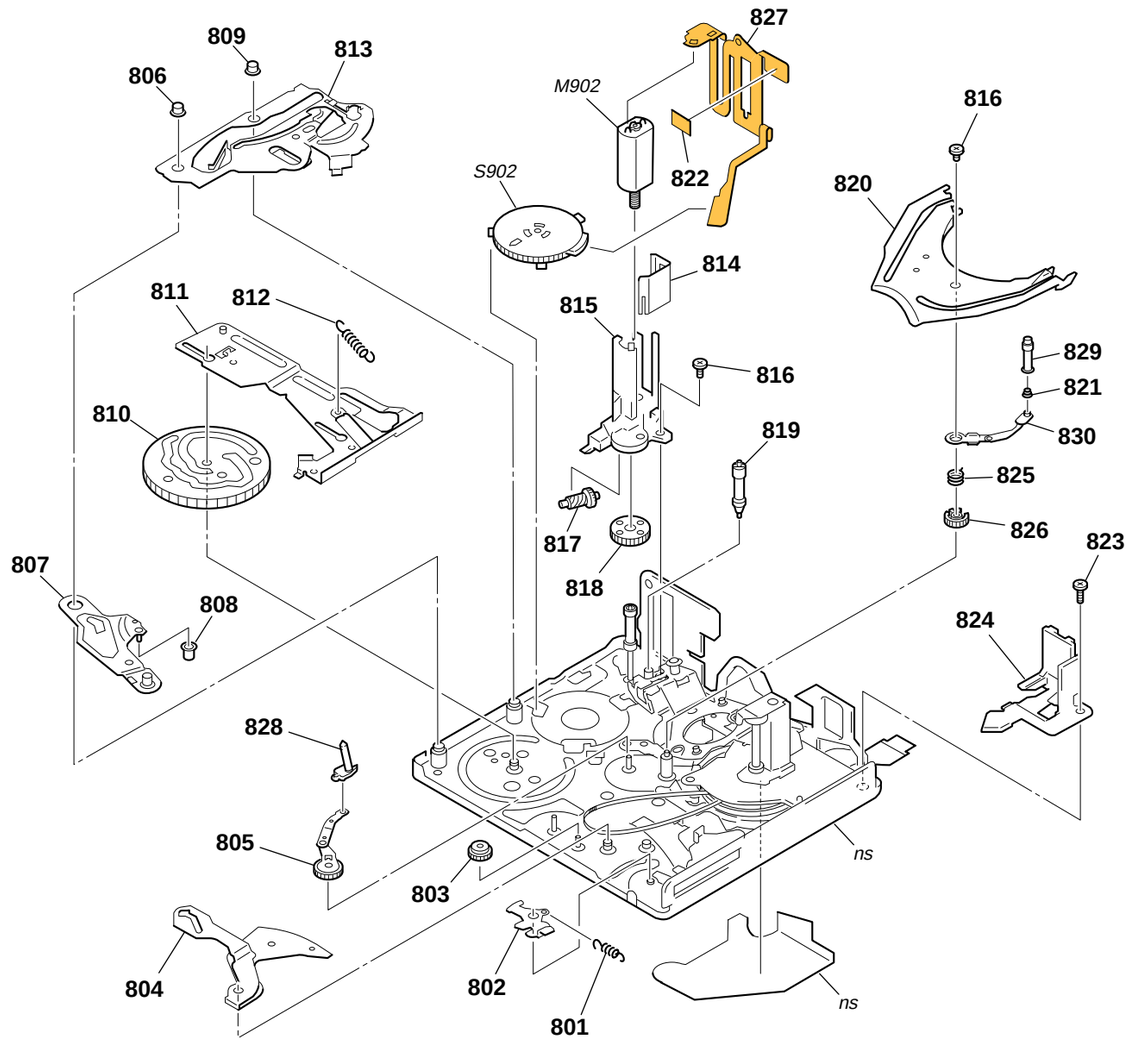
Note: *FP-468 is included in the LS block assy and is attached to chassis by hot-press.*
Because installation of FP-468 requires a very high accuracy, FP-468 is not supplied as an independent service parts.

Ref. No.	Part No.	Description
751	A-7095-402-B	BRAKE (T) BLOCK ASSY
752	3-079-241-01	PLATE, LS CAM
753	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
754	3-079-246-01	SPRING (RELEASE RACK),EXTENSION
755	3-079-248-01	POSITIONING (S), CASSETTE
756	3-079-244-01	SPRING (ULE), EXTENSION
757	X-3952-932-1	BRAKE ASSY, ULE
758	3-079-245-01	RACK (S), RELEASE
759	3-079-247-01	BRAKE (S)
760	3-059-090-11	SCREW (M1.4X2.5), SPECIAL HEAD
761	3-079-242-01	SPRING, TENSION (TENSION REGULATOR)
762	A-7095-401-A	LS BLOCK ASSY
763	3-079-267-01	HOLDER (S), SENSOR
764	3-079-268-01	HOLDER (T), SENSOR
765	X-3952-936-2	TABLE ASSY, S REEL

Ref. No.	Part No.	Description
766	3-703-816-15	SCREW (M1.4), SPECIAL HEAD
767	3-079-243-01	SPRING (PINCH RETURN), TORSION
768	X-3952-934-1	ARM ASSY, PINCH
769	3-052-062-02	NUT, TG7
770	3-079-219-02	TG7
771	3-081-591-01	SPRING, COMPRESSION (TG7)
772	X-3952-935-3	ARM ASSY, TG7
773	3-079-237-01	ADJUSTOR, BAND
774	A-7095-403-B	TG2 ARM BLOCK ASSY
D901	6-500-471-01	DIODE GL453E00000F (TAPE LED)
H901	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (S REEL)
H902	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (T REEL)
MIC902	1-817-175-12	PIN, CONNECTOR (WITH DETECTION SWITCH)
S903	1-529-566-51	SWITCH, PUSH (1 KEY) (C.C. DOWN)
Q901	6-550-402-01	TRANSISTOR PT4850FE000F (TAPE END)
Q902	6-550-402-01	TRANSISTOR PT4850FE000F (TAPE TOP)

5-3. Mechanical Chassis Block Assembly

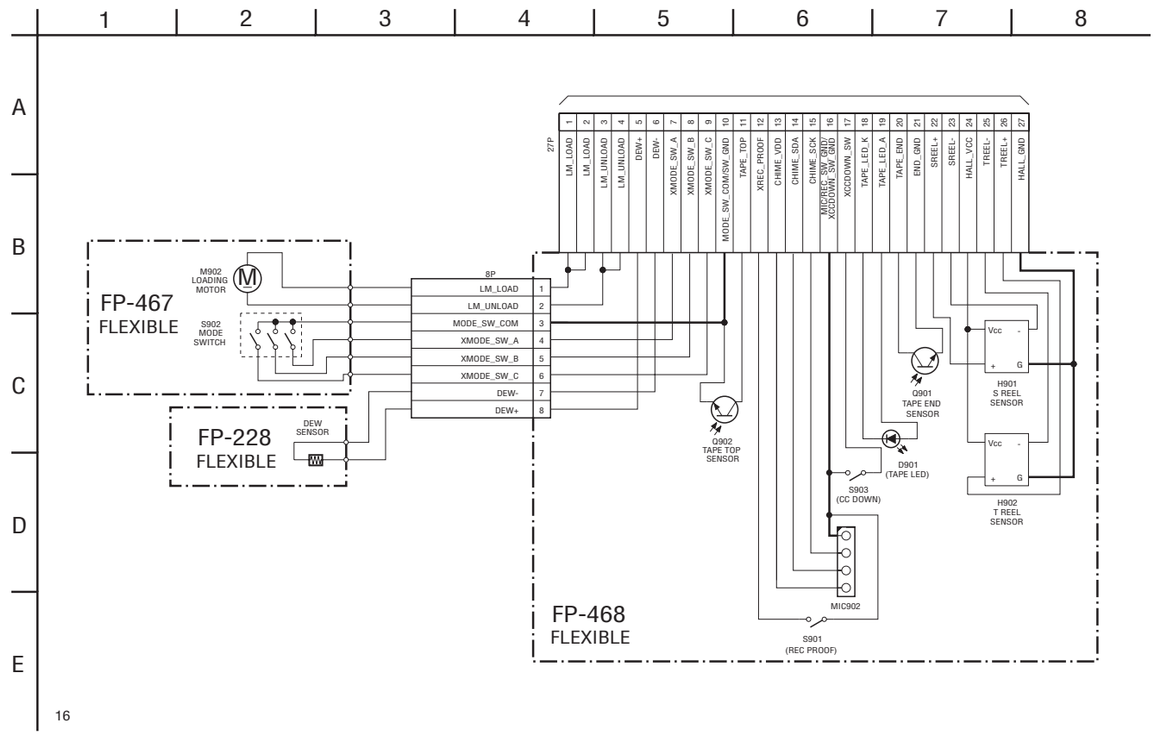
ns : not supplied



Ref. No.	Part No.	Description
801	3-079-314-01	SPRING (EJ), EXTENSION
802	3-079-327-01	ARM, EJ
803	3-079-323-02	GEAR, CONVERSION
804	3-079-324-02	ARM, GL DRIVING
805	X-3952-928-1	GL (S) ASSY
806	3-079-315-01	ROLLER (S1), LS GUIDE
807	X-3952-925-1	ARM ASSY, LS
808	3-079-320-01	ROLLER, LS
809	3-079-316-01	ROLLER (S2), LS GUIDE
810	3-079-319-01	GEAR, CAM
811	X-3952-941-1	SLIDER ASSY, M
812	3-079-321-02	SPRING (PINCH), EXTENSION
813	X-3952-940-2	PLATE ASSY, TG2 CAM
814	3-079-312-01	SHIELD, MOTOR
815	3-079-307-01	HOLDER, MOTOR
816	3-703-816-15	SCREW (M1.4), SPECIAL HEAD

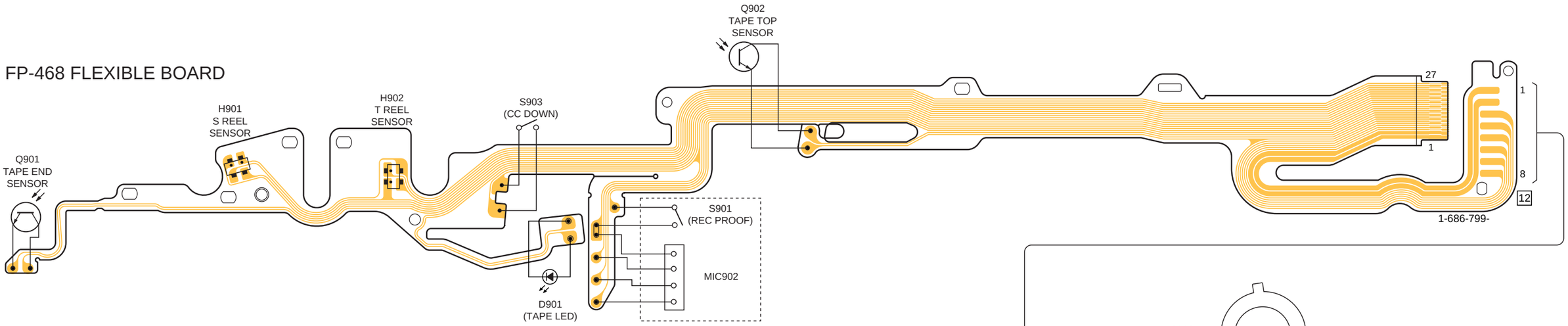
Ref. No.	Part No.	Description
817	3-079-308-01	SHAFT, WORM
818	3-079-309-01	GEAR, DECELERATION
819	X-3952-942-2	ROLLER ASSY, TG3
820	3-079-325-01	RAIL, GUIDE
821	3-079-295-02	SPRING, TG5
822	1-677-049-11	FP-228 FLEXIBLE BOARD (DEW SENSOR)
823	3-079-328-01	SCREW ,SPECIAL (EG GRIP)
824	3-079-326-02	SUPPORT, TG7
825	3-079-301-01	SPRING (GLT), TORSION
826	3-079-298-01	GEAR (T), GL
827	1-686-798-11	FP-467 FLEXIBLE BOARD
828	X-3952-927-2	COASTER (S) ASSY
829	X-3952-930-3	ROLLER ASSY, TG5
830	X-3952-929-3	COASTER (T) ASSY
M902	A-7095-396-A	MOTOR BLOCK ASSY, L (LOADING)
S902	1-477-679-11	ROTARY, ENCODER (SWITCH)

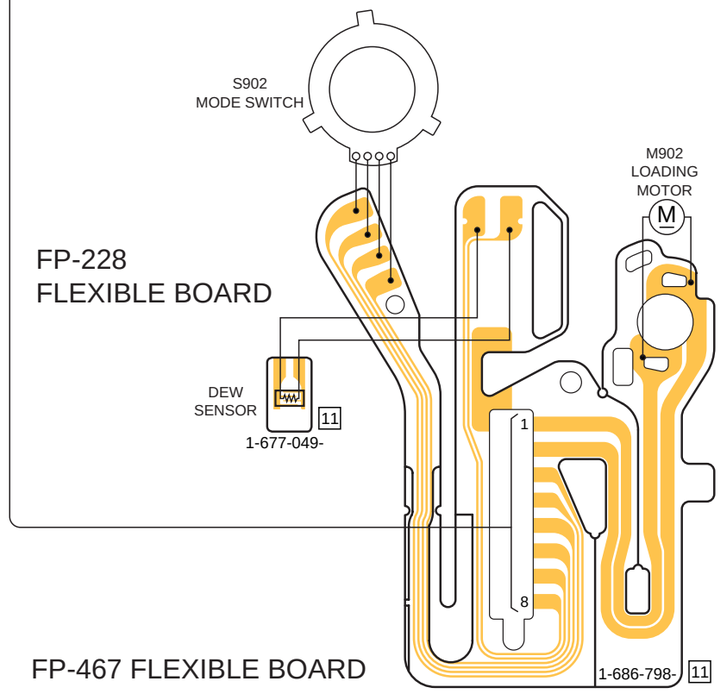
6. Schematic Diagrams



16

7. Printed Wiring Boards





2003A1600-1
©2003.1
Published by DI Customer Center

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2003.01	Official Release	—	—